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BUREAU OF INDIAN AFFAIRS

WILDFIRE PREVENTION INSPECTIONS TECHNICAL GUIDE

BIA WILDFIRE PREVENTION
TECHNICAL GUIDE # 6
Version 1.0

OFFICE OF TRUST SERVICES
DIVISION OF FORESTRY AND WILDLAND FIRE MANAGEMENT
Branch of Wildland Fire Management

FOREWORD

This BIA Wildfire Prevention Technical Guide provides standards, background, guidance, inspection checklists and references for conducting fire prevention inspections on a wide variety of industrial operations most likely to be found on Indian Lands.

Industrial operations on Indian Lands result in many wildfires each year. These fires are preventable with good maintenance and better awareness. The intended users of this guide are any Tribal or BIA Agency personnel conducting fire prevention inspections.

This guide is largely based on the National Wildfire Coordinating Group's (NWCG) Industrial Operations Fire Prevention Guide (PMS-412). That guide is no longer supported by the NWCG and is considered obsolete; however, much of that material is still current and has been used in the text of this guide.

The BIA Wildfire Prevention program gratefully acknowledges the information provided by the NWCG, California Department of Forestry and Fire Protection (CALFire), U.S.D.A. Forest Service, and many others that was used in developing this document.

Contents

I. INTRODUCTION

Industrial operations and recreational sites of various kinds exist in wildlands throughout Indian Country. The size and scope of these operations ranges from small timber harvesting operations to massive construction sites. Some are semi-permanent operations, while most are transitory and mobile.

Due to concerns about liability, and the need to protect their workers and investments, most industrial operations have safety programs that include wildfire prevention measures. Many conduct inspections as part of their daily schedule. However, the BIA and Tribal prevention programs should not entirely depend upon the operators to conduct these inspections.

Nearly all industrial and recreational operations in the wildlands provide many potential sources of ignition. The wildfire prevention inspector can become overwhelmed by the sheer number of potential ignition sources. This is complicated by the fact that ignition sources can change, depending on the stage in the operation. The purpose of this guide is to help the wildfire prevention inspector develop a systematic methodology for conducting inspections.

II. GENERAL INSPECTION GUIDANCE

PURPOSE

The primary purpose for conducting inspections for wildland fire prevention is to identify potential ignition sources and inform the operator of any corrective actions, hazard abatement, or maintenance needed to reduce the risk of ignition from the source. A secondary purpose is to inform operators and raise their awareness of the need to practice fire prevention in their operations. Inspectors may also observe other violations of law or regulation; however, these are not the focus of wildfire prevention inspections. When other types of violations are observed, report them to the operator and the jurisdictional authority.

HOW TO CONDUCT INSPECTIONS

To be useful, inspections for fire prevention need to focus on the recognized fire risks, and hazards associated with the specifics of the operation; any required fire prevention devices or equipment; and, any required mitigation measures for the operation. The focus of wildfire prevention inspections should be on legitimate, known, ignition risks. The inspector must avoid falling into the trap of being on a "treasure hunt"; and, identifying unrealistic or hypothetical ignition risks.

Safety Concerns

Industrial operations are governed by a variety of safety rules. These rules are designed to protect the workers, not the fire prevention inspector. At times, it may seem difficult or impossible to conduct a fire prevention inspection without infringing on these rules. The fire prevention inspector needs to become familiar with the safety rules of the operation and follow them. There is no inspection worth placing anyone's safety at risk.

The minimum safety equipment required on any industrial site is a hardhat, safety glasses, gloves, ear protection, a high visibility safety vest, and boots with non-skid soles. The inspector must always remember to have these on, when conducting inspections. Additional special personal protective equipment (PPE) may be required on some sites. It is the inspector's responsibility to become familiar with the required PPE for a site prior to conducting an inspection.

Inspections may need to be conducted in a remote area of a larger site. If so, the inspector needs to be prepared to travel on foot or in a Utility Task Vehicle (UTV) to those areas. When conducting inspections at these remote locations, the inspector needs to be aware of any special safety considerations for the inspection, as well as while travelling to, and from the site. When conducting an inspection in one of these remote sites, it is best to work with another person. If possible, the other person should be an employee of the operation, that is knowledgeable of any safety concerns, for the location.

Inspection Standards

These "standards" establish a systematic methodology for conducting inspections that protect the inspector and the operator.

Check In – Check in upon arrival with the site manager, foreman or lead worker, if present. Let them know who you are, and why you are looking. Assure them that safety is your concern as well. Offer them the opportunity to conduct a joint inspection, and ask about any unusual hazards. Learn and use the correct terminology for their operation.

Practice Safety First – if it can't be done safely, don't do it, until it is safe. Industrial operations can be dangerous work sites, heavy equipment is unforgiving. Be aware of traffic along roads, as well as on the site.

Know What to Look For – Conducting inspections requires knowledge of: the materials involved; processes used; machinery used; transportation methods and routes; laws, rules, regulations; and, contract/lease/permit requirements that apply to the operation. If there are industry standards, become familiar with them.

Stick to the Mission – Remember the purpose for the inspection is fire prevention. Other issues may be present and should be reported to the operator, and if necessary, the proper authorities; however, the only reason the inspector is present, is to look for possible sources of ignition due to the industrial operation.

Document All Findings – Use any agency approved forms or checklists. If there are no agency approved forms or checklists, develop a systematic method of taking field notes. Using the same process with each inspection will avoid creating an impression of favoritism. Be thorough, fair and factual. Don't speculate in the documentation. Stick with what is required by law, regulation or contract/lease/permit provision. Avoid the temptation to add on your own requirements. Include dates, times, locations, contacts, a description of each item checked, and the status of the item. Document things that met the standards as well as those that didn't. Be very specific when describing any violation or wildfire safety issue.

Take Pictures – Photographs can greatly augment documentation. They can be used to visually display what could take pages of notes to describe. Photos are best used in combination with a photo log. They should be taken with the same discipline and protocols as used in conducting a wildfire origin and cause investigation.

Check Out – Check out with the site manager, foreman or lead worker, if present. Communicate any findings of violations, risks or hazards that need immediate mitigation. Keep it as friendly as possible. If necessary and authorized, issue any "Cease Operations" orders.

Report Findings – Report any routine findings to contract, permit, or lease compliance officials as soon as possible. Violations of law should be reported to the appropriate law

enforcement officials. If there are any egregious fire safety issues or "Cease Operations" orders were issued; these should be reported to the inspector's supervisor, or other appropriate official upon leaving the site.

Operator Relations

It is essential to develop a positive relationship with the site operations leadership. None of these operations look forward to the next "government" inspection. Some will protest that another inspection interferes with their ability to turn a profit or meet a deadline. It is the inspector's responsibility to explain to the operator the need for fire prevention inspections to protect their safety, as well as the Indian owner's assets and overall public safety. Always try to work with the operators to ensure that fire prevention inspections have a minimal impact on their production.

Guidelines for Effective Operator Relations

1. Ensure that fire prevention inspections are included in lease agreements, timber sales contracts and right-of way agreements. This provides some authority to conduct the inspection when an operator is resistant.

2. Remember that safety is a mutual concern. The inspector should never put the operator in the awkward position of pointing out their presence has violated safety policies on their operation.

3. Offer to conduct a joint inspection on the first visit, to get acquainted.

4. Inspections of industrial sites should be scheduled to coincide with the fire season. This avoids the appearance of an unnecessary inspection.

5. The inspector should always maintain a courteous, but professional relationship with the operator. The inspector should never compromise their ethics, integrity or independence by accepting gifts of any kind from the operation.

6. The inspector should use a "service provider" approach instead of a "regulator/enforcer" approach. The operator also should be a beneficiary of the inspection process.

7. Conduct the inspection in a business-like manner. The inspector should get the inspection completed as quickly as possible. Then provide the operator a copy of the findings, answer any questions, and depart the site promptly.

8. Be flexible. If the operator is at a crucial stage in processing, the inspector should be willing to reschedule so that unwanted impacts are avoided.

Joint Inspections

Joint inspections are intended to familiarize fire protection, land management and company personnel with potential violations and other problems and conditions. They often result in mutual agreement on appropriate corrective action(s). Joint inspections provide an opportunity for mutual understanding of the problems facing both industry and the agency, as well as training opportunities for all participants. **NOTE:** A railroad company employee *must* be present when conducting inspections of railroad equipment.

Inspection Planning

A little planning will significantly improve the inspection process. Most inspections can be conducted while patrolling.

Unstaffed, stationary sites such as power lines, electric facilities, and oil/gas wells may only need to be inspected every 3 to 5 years. An easy way to ensure all of the lines get inspected regularly is to divide the prevention planning unit into 3 – 5 sub units. Then systematically inspect all of the sites/lines in one unit, each year.

Staffed sites and transitory sites such as portable sawmills, pipeline construction, and timber harvesting should be inspected at least once per fire season. These sites may be re-inspected as needed; however, excessive re-inspections may be basis for harassment claims.

Equipment

In addition to the PPE discussed earlier, the inspector will need inspection forms, a clipboard, camera, binoculars, a 0.024 inch pin gauge, and a magnifying glass.

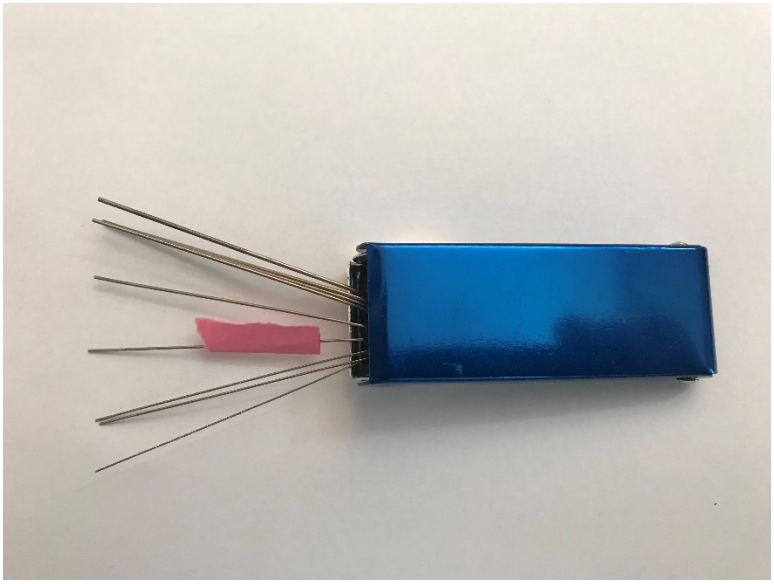


Figure 1 - Pin Gauges

III. INSPECTION GUIDANCE FOR SPECIFIC OPERATIONS

MACHINERY AND HEAVY EQUIPMENT

All industrial operations have machinery. Bulldozers, road graders, masticators, trenchers, front end loaders and even farm tractors are examples of the heavy equipment commonly found on industrial operations in the wildlands. Machinery of any kind in the wildlands is a potential source of wildfire. Often it is the machinery, itself, catching on fire that becomes the source of ignition. These fires are preventable with good maintenance, daily pre-use inspections and operator awareness. The variation in size and purposes for this machinery are enormous. Most machinery is powered by an internal combustion engine, although some may be powered by electric motors. It is impossible to list all of the various kinds of machinery an inspector may encounter. However, the principles, and most common potential ignition sources are generally shared across the spectrum.

General Inspection Guidance

- Observe each piece of equipment in use.
- Inspect the equipment when not in use, and with engines turned off.
- Make certain the parking brake is set, and wheels are chocked prior to inspecting.
- If the engine has an on-demand or automatic switch feature, make certain it is in the "off" or "disconnected" position.

Important: Only the operating company's employees should turn any nuts, screws or other fasteners on their equipment, due to liability and familiarity concerns.

General Equipment Ignition Sources

- Accumulation of debris inside mechanical compartments.
- Buildup of oil, grease, and fuel from leaks and spills.
- Faulty or damaged electrical system wiring and components.
- Overheating brakes.
- Heavy buildup of flammable materials around a rotating drive shaft.

Internal Combustion Engines

Internal combustion engines are very commonly used in wildlands. Three primary types exist: small multi-position engines (such as chain saws, weed eaters and lawnmowers); larger single position engines (such as generators, compressors and pumps); and those used in vehicles and heavy equipment. All three have several common inspection points, although the specifics of the inspection may differ by the equipment type and use.

Fueling systems –

Fires caused by the fuel system can be reduced by a comprehensive preventive maintenance program. The fuel system should be checked regularly for any signs of excessive vibration, cracks, abrasion, or loose fittings. This is particularly important on those portions of any system that are above exhaust manifolds or pipes. Fuel under pressure can easily ignite, when exposed to heat such as from an exhaust system. Issues with faulty fueling systems should be addressed immediately. The equipment should not be used until it is repaired.

What to Look For:

- leaking fuel caps,
- leaking fuel tanks
- leaking fittings
- accumulations of oily dust and grime around fittings
- substandard "field repairs" to metal fuel lines using plastic or rubber tubing
- visibly leaking or damaged fuel lines

Inspection Frequency:

Fueling systems should be inspected annually on each piece of equipment.

Exhaust systems –

Fires caused by exhaust systems are most often ignited by carbon particles or hot gases coming in contact with flammable vegetation (e.g., dry grass, leaves, or needles) or by direct contact with such fuels by a hot metal part of the system (e.g., muffler, catalytic converter, or exhaust pipe). The third way is for fuels (e.g., weeds, pine needles, leaves, wood chips, sawdust, rodent nests, or paper) to come to rest on the exhaust manifold.

1) Exhaust Carbon or Particles

Carbon particles and hot gases can escape and start fires through cracks, breaks, burned or rusted out holes, and loose connections. The entire exhaust system should be inspected at frequent intervals to make sure that none of these conditions exist. Research has shown that carbon particles greater than 0.023 inch in diameter have enough energy to ignite wildland fuels.

2) Spark Arresters

Spark arresters, if required, should be inspected, cleaned out and/or replaced as needed, or every 30 days at a minimum. A 0.024 inch needle or pin feeler gauge is very useful when inspecting spark arresters and exhaust systems. Obtain a copy of the US Forest Service's most recent edition of the Spark Arrester Guides for specifics on each spark

arrester. The Spark Arrester Guides can be found at: https://www.fs.fed.us/t-d/programs/fire/spark_arrester_guides/.

What to look for:

- Cracks, breaks, burned or rusted out holes, and loose connections anywhere along the exhaust system from the manifold to the tailpipe or flare stack.
- A spark arrester, if required for the engine.
- Check the spark arrester for function.
- Modified exhaust systems to remove the muffler or catalytic converter.
- Check the exhaust manifold for debris, nests, or the presence of other flammable materials.
- A charged, usable, 2-5 lb. multi-purpose ABC or a Class C fire extinguisher nearby (within 100 ft. of the equipment).

Inspection Frequency:

Check the entire exhaust for leaks annually. Spark arresters should be cleaned out every 30 days. **The operator should inspect the exhaust manifold daily at the beginning of the shift.**

Electrical systems –

Fires caused by electrical systems on equipment are typically the result of a short circuit in the wiring. Short circuits can be caused by frayed wiring, loose connections, abraded or melted insulation, or a battery connection. They can also start as a result of the improper use of jumper cables. Inspections should focus on points of attachment, splices, and the protection of wiring from the exhaust system and moving parts.

What to look for:

- Frayed wiring, loose connections, abraded or melted insulation, or a loose battery connection.
- Points of attachment, splices, and if wiring is protected from the exhaust system and moving parts.
- Signs of arcing in the engine compartment.

Inspection Frequency:

Check electrical system on each piece of equipment annually. **The operator should inspect the engine compartment daily at the beginning of the shift.**

Electric Motors

Electric motors are sometimes used in the wildlands when electricity is available. Electricity greatly increases the hazards when working on a site. If the current involved is great enough, electric arcs can start a fire. Fires can also be created by overheating equipment or by conductors carrying too much current. Extremely high energy arcs can damage equipment, causing fragmented metal to fly in all directions. In atmospheres that contain explosive gases or vapors or combustible dusts, even low-energy arcs can cause violent explosions.

In most cases, the inspection of electric motors must be done from a safe distance of at least 10 ft. Exceptions to this should be rare, and only if accompanied by a qualified company employee, who has had special training in electricity safety. In depth inspections should only be performed by a qualified electrician. When inspecting electric motors, listen for sounds the motor may be laboring, be aware of odors, and look for signs of arcing, or short circuits on wiring.

What to Look For:

- Signs of previous electric motor failures (sooting or staining)
- Compromised insulation, and sheathing.
- Acrid, metallic odors, the smell of ozone, or smells of burning rubber.
- Problems with the delivery system for power to the motor.
- Listen for excessive vibration, whining or sounds that a bearing or bushing may be failing.
- A charged, usable, 2-5 lb. multi-purpose ABC or a Class C fire extinguisher nearby (within 50 ft. of the equipment).

Inspection Frequency:

Check each piece of equipment annually.

Heavy Equipment

Heavy equipment fire risks consists of more than just the power source (engine). The equipment's moving parts and hydraulics all pose wildfire risks. Some of these risks can be reduced by inspections. Some cannot.

What to Look For

- Check maintenance logs for regular and up-to-date maintenance.
- Is the machine in a reasonably clean condition, considering the operating environment?

- Is the engine compartment cleaned of debris or excessive oil and fuel accumulations?
- Is there a battery disconnect switch on the machine?
- Is wiring in good condition, insulation pliable and unbroken, and splices properly wrapped?
- Is wiring secured away from moving parts and exhaust systems?
- If required, are spark arresters clean and functioning, with no modifications?
- Are there any leaks in, or modifications to the exhaust systems?
- Has the belly pan been cleaned in the past week?
- Are hydraulic lines secured away from moving parts or exhaust systems?
- Have bearings and bushings been lubricated according to scheduled maintenance?
- Are excessive flammables present in the operator compartment?
- Is a charged, usable, 10 lb. or larger multi-purpose ABC, or a Class C fire extinguisher on the machine?

Inspection Frequency:

Check each piece of equipment annually, near the beginning of fire season. Additional inspections may be needed if frequent wildfires are associated with the operation.

Manual/Automatic Fire Suppression Systems

Many models of heavy equipment have dry chemical fire suppression systems, which are mounted inside the engine compartment, and should be inspected. There are three parts to the system, the firing mechanism, the extinguisher and the distribution system.

What to Look For

1. The Firing Mechanism

The firing mechanism consists of a nitrogen cartridge, that can be visually checked for a manufacturing date stamped on the neck. If the date is over 10 years old, the cartridge needs to be replaced. Also check wiring to the cartridge for any frays and check for tight mounting brackets.

2. Extinguisher

When inspecting the extinguisher, the top lid can be removed and the dry chemical stirred to check for wetness or clumping. The chemical must be dry and loose to be effective. In accordance with the National Fire Protection Association (NFPA) Standard 17, the chemical must be replaced every six years. Also inspect brackets for tightness.

3. Distribution System

The distribution network begins at the extinguisher outlet and ends at the nozzles. The following are items to check:

- Check for hoses routed out of the way of all engine compartment parts. The hoses should be secured with connectors and hose tie wraps.
- Look for hose kinks and damaged hose.
- Where hose or pipe runs through metal there must be a rubber grommet in the hole.
- All nozzles must be aimed at hazard areas, and the hinge on the cone nozzle cap, must be mounted away from the hazard areas. There must be spring tension in nozzle caps (not all models have caps) and no debris accumulations on cone caps.
- The battery wiring to the extinguishing system should be checked for flaws.

Inspection Frequency:

Check these systems annually, with the equipment inspection, near the beginning of fire season. Additional inspections may be needed if frequent wildfires are associated with the operation.

What to Document on Machinery Inspections:

- Date, time, location, inspector's name, company name, and the names of any company employees helping with the inspections.
- The make, model, equipment number and VIN/Serial number for each piece of equipment inspected.
- Any issues with the equipment that need to be addressed.
- Any equipment that is unsafe to use.
- Take photographs of repairs needed.

What to Report:

Reports should be provided to the company and to the lease compliance officer. The reports can be copies of the inspection forms or a written letter/notice to the company, detailing the specifics of the inspection or both. The lease compliance officer may choose to provide the written correspondence to the company.

The report should detail:

- The date, time, location, inspector's name, company name, and the names of any company employees helping with the inspections.
- The make, model, equipment number and VIN/Serial number for each piece of equipment inspected.
- Any issues with each piece of equipment that need to be addressed. Also report if there were no issues.
- Any equipment that is unsafe to use.
- Photographs of repairs needed.

A copy of the Heavy Equipment Inspection Record is found under Inspection Records.

ELECTRIC POWER

Electrical power is commonly delivered to users through the wildlands. Inspections should be conducted on all power lines and facilities on a periodic basis. Normally, the power suppliers conduct these inspections to guarantee service to their customers; however, remote locations or those in areas where there are few customers, may not get inspected as often as needed.

Powerlines have the potential to start wildfires that grow rapidly and become very damaging. This is because the same weather conditions that contribute to power line faults, also contribute to the rapid spread of wildfire. The ***most critical of these weather factors is high wind***, which is commonly accompanied by high temperatures and low humidity.

High, gusty winds may cause vegetation to sway or fall into power lines, or break off limbs. High winds may also create vibrations in power lines that can lead to stress failures or cause loose connections to separate. Arcing usually accompanies such faults. Automatic Reclosers re-energizing the line into the fault may cause repeated arcing and increase the probability of igniting vegetation.

Safety is a primary concern with electrical power. **All powerlines must be regarded as live**, unless a power company official declares otherwise. Powerlines can transmit electricity into vegetation, if it is in contact with them. Powerlines on the ground can electrify a significant area around them. Powerlines in a body of water can electrify it as well.

The NWCG offers a course on the Investigation of Powerline Caused Wildland Fires (X-900) available on a DVD through their catalogue. This course is strongly recommended to anyone inspecting powerlines.

An understanding of the electrical distribution network helps in planning power line inspections.

Generation

Electrical power is manufactured at a generation station or power plant. These are typically large industrial type facilities, with tight security access. Power generation stations are some of the most protected and secure industrial complexes in the United States. Examples are hydroelectric dams, nuclear reactors, coal and natural gas power plants. Less secure and less common are solar power facilities and wind turbines. Most power generation facilities have their own inspection personnel and maintenance schedules. They are not responsible for starting many wildland fires. Wind turbines can be an exception to this; however, inspection of wind turbines is beyond the scope of the wildfire prevention personnel.

Power Lines (General)

Powerline inspections should focus on the distribution lines and transformers. A cursory visual inspection of transmission lines may also be useful in remote areas. It may be

useful to conduct initial inspections with a representative of the power company, to develop a positive relationship and mutual trust. They may also be able to provide training and network maps. At a minimum, the prevention inspector should contact the power company, to determine who their point of contact is, for any issues identified in the inspections.

What to Inspect: Inspections should begin along the powerline one-quarter to one-half mile off of Indian Lands to about the same distance after the line leaves Indian Lands.

Clearance Distances: Electric power can arc from the line to adjacent objects. Some standard safety clearances have been developed for the different voltages. Local guidelines may be even stricter, so always verify these with the power company providing the service.

The radial distance from the conductor (individual power line):

Distribution lines and smaller transmission lines at 2.4 to 72 kilovolts (kV) (2,400 to 72,000 volts) – Clearance of at least 4 ft.

Mid-range transmission lines with voltages of 72 to 110 kV (72,000 to 110,000 volts) – Clearance of at least 6 ft.

High voltage transmission lines with more than 110 kV (110,000 volts) – Clearance of at least 10 ft.

Equipment needed: Binoculars, Inspection Forms (or Tablet and Collector App for ArcGIS), Camera and GPS unit. Climbing gear is not needed, since the inspections should only be conducted from the ground. The California Power Line Fire Prevention Field Guide is an excellent reference document to print and carry on inspections. It can be found on-line at: http://cdfdata.fire.ca.gov/fire_er/fpp_engineering_view?guide_id=15.

Transmission Lines

Electrical power is transmitted from the generation station to a substation via transmission lines. Transmission lines are easily recognized by the taller towers that hold the lines. These are high voltage lines carrying voltages of 36kV to 500kV. Similar to generation stations, transmission lines are frequently inspected by the power companies and are well maintained. Since such a large number of customers are affected by the transmission lines, their maintenance is a high priority for the power company. As a result, very few wildland fires start due to failures of the transmission lines.

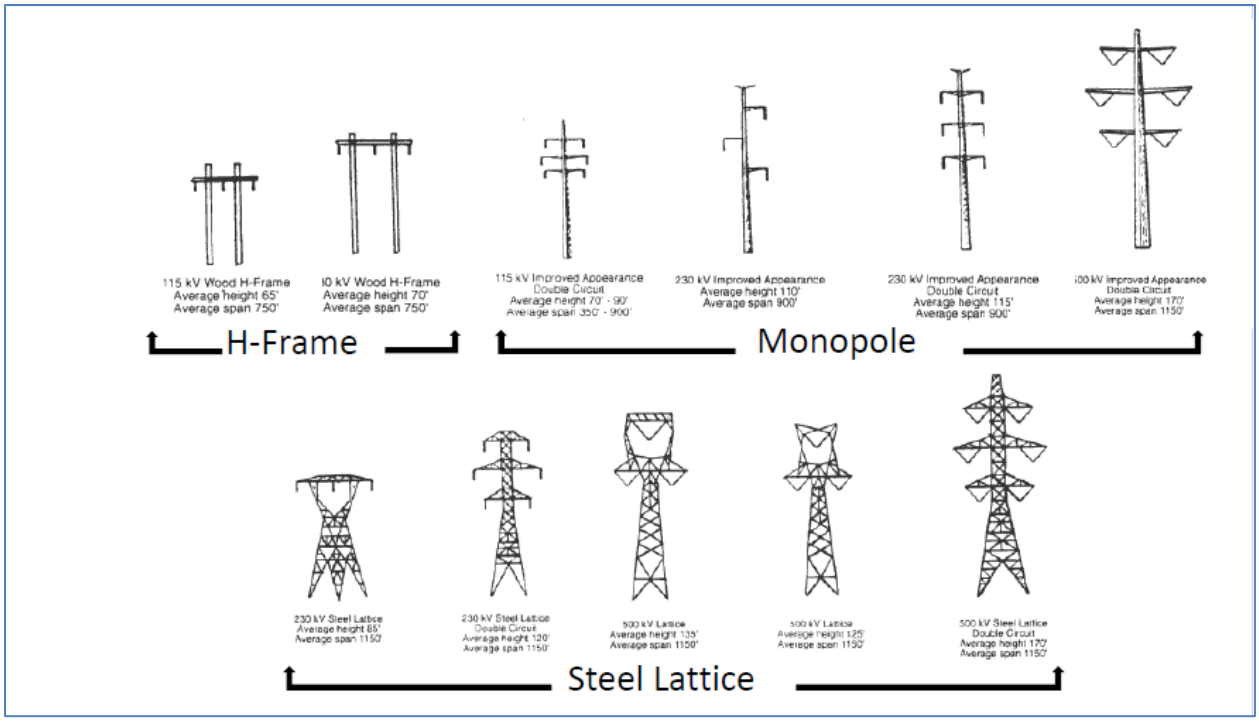


Figure 2-Transmission Line Towers

These lines and towers take the most direct route possible from the power station to the substation. Since they take these direct routes, they occasionally pass through nearly inaccessible terrain. They may have service roads that can be driven in four wheel drive vehicles. Some areas may require the inspector to travel by foot, UTV or horseback.

What to look for:

- Broken insulators.
- Damaged towers.
- Excessive bird droppings near insulators.
- Bird/animal nests.
- Timber/dead trees encroaching on the right-of-way.
- Vegetation clearances.

Inspection Frequency:

- Every 5 – 10 years.
- Following a significant weather event, earthquake, or other natural disaster.

What to Document:

- The span or segment of line inspected with date and times. This is normally on a map.
- The individual tower number or numbers (for a span of line).
- Any specific issues /hazards identified with location, date, time and photograph.
- Include photographs and photograph log with the inspection records.

What to Report:

- The individual tower number or numbers (for a span of line).
- The Latitude and longitude of the tower or area.
- The specific issue /hazard identified
- Provide a photograph.
- Provide a copy of the report to the Utility Company and the Agency/Tribal Lease or Right-of Way Compliance Officer.

Distribution Lines

Electric power is carried from the substation to residential and commercial customers via the distribution lines.

The primary and secondary distribution lines, poles and their associated transformers are the main focus for fire prevention inspections. These lines and poles are generally found along roads and streets. They can often be inspected visually from the vehicle.

Primary Distribution Lines -

These smaller lines commonly carry voltages of 2.4 kV to 35 kV. They carry electricity from the substation to a transformer (or rarely directly to an industrial operation). Most primary distribution lines are well maintained and regularly inspected by the power company or their contractor. Distribution lines in remote or difficult to reach areas may not be inspected on a frequent basis. These lines are the lines on the shorter poles. They may occasionally be insulated, but most often are not.

Figure 3 - Distribution Lines

Secondary Distribution Lines -

The secondary distribution lines carry the power after it passes through a transformer, to the customer service lines. The secondary lines normally carry voltages of 120 to 480 volts. They are often the most poorly maintained lines. Again, they may or may not be insulated.

There are sometimes primary and secondary distribution lines on the same pole. Primary lines are generally located at the top of a pole. They carry the higher voltages. The secondary lines are located lower on the pole.

Customer Service Lines-

These are the lines from the distribution system to the individual customer. They may be residential or commercial applications. These lines carry voltages of 120 to 480 volts. They are often the most poorly maintained lines on the system and a common point for failure. When they occur on Indian Lands, they should be inspected as if they are part of the distribution network.

What to look for:

- Broken insulators.
- Damaged poles.
- Bird/animal nests.
- Excessive bird droppings near insulators.
- Timber encroaching on the right-of-way.
- Vegetation clearances.

Inspection Frequency:

- Every 3 – 5 years.
- Following a significant weather event, earthquake, or other natural disaster.

What to Document:

- The span or segment of line inspected, with date and time. This is normally on a map.
- The individual pole number or numbers (for a span of line) where issues are identified.
- Any specific issues /hazards identified with location, date, time and photograph.
- Include photographs and photograph log with the inspection records.

What to Report:

- The individual pole identification number or numbers (for a span of line).
- The latitude and longitude of the pole or area.
- The specific issue /hazard identified.
- Provide a photograph.
- Provide the date and time of the inspection, along with the inspector's name and contact information.
- Provide a copy of the report to the Utility Company and the Agency/Tribal Lease or Right-of Way Compliance Officer.

Substations

Substations receive power from the transmission lines and step it down to loads carried over smaller transmission lines or distribution lines. These facilities serve large numbers of customers, so they are well maintained and secured. They are normally fenced in with chain-link fences and rolled wire. The apron is typically crushed rock, with a buffer zone outside of the fenced area to the surrounding vegetation. The size and purpose of the substation determines the clearance needs. Fire prevention inspections of substations are typically limited to the vegetation surrounding the substation.

What to look for:

- Broken insulators.
- Damaged fences.
- Excessive bird droppings near insulators.
- Bird/animal nests.
- Timber/dead trees encroaching on the right-of-way.
- Vegetation clearances.

Inspection Frequency:

- Every 5 to 10 years.
- Following a significant weather event, earthquake, or other natural disaster.

What to Document:

- The location of the substation inspected with date and times.
- Any specific issues /hazards identified with location, date, time and photograph.
- Include photographs and photograph log with the inspection records.

What to Report:

- The Latitude and longitude of the substation.
- The specific issue /hazard identified
- Provide a photograph.
- Provide a copy of the report to the Utility Company and the Agency/Tribal Lease or Right-of Way Compliance Officer.

Transformers

Transformers are the point in the distribution network where the power is stepped down from the higher voltage current of the primary distribution lines, to the lower voltages used by most customers. They are typically located on the power poles, but sometimes they are also located in clusters or banks. They are the large canister appearing devices. Transformers can often be the source of wildland fires. Animals will sometimes use them or their attachments for nesting locations. Transformers are the point for many connections, which increases the potential for a connector to fail. They also can sometimes corrode and short circuit. Transformers should be visually inspected along with the distribution network.

Transformers can generally be inspected from the ground.

What to look for:

- Broken/damaged insulators.
- Sub-standard fuses, switches, and connectors.
- Damaged poles and connections to the pole.
- Bird/animal nests.
- Excessive bird droppings near insulators.
- Signs of corrosion or arcing.
- Vegetation climbing the pole or growing near the transformer.

Inspection Frequency:

- Every 3 to 5 years.
- Following a significant weather event, earthquake, or other natural disaster.

What to Document:

- The span or segment of line inspected, with date and time. This is normally on a map.
- The individual pole number or numbers (for a span of line) where issues are identified.
- Any specific issues /hazards identified with location, date, time and photograph.
- Include photographs and photograph log with the inspection records.

What to Report:

- The individual pole identification number or numbers (for a span of line).
- The latitude and longitude of the pole or area.
- The specific issue /hazard identified.
- Provide a photograph.
- Provide the date and time of the inspection, along with the inspector's name and contact information.
- Provide a copy of the report to the Utility Company and Agency/Tribal Lease or Right-of Way Compliance Officer

A copy of the Power Line Inspection Record is found under Inspection Records.

OPERATING AREAS

Every industrial operation has an area on which its activities are conducted. Some of these areas, such as mines, are in fixed locations for long periods of time. Others, such as logging and construction, are mobile and transitory, remaining in one location for only a few weeks or months. For some, such as petroleum and steam wells, the nature of the activity and of the fire problem changes over time (drilling versus pumping and servicing). For fire prevention purposes, the access, routes between the scene of the actual industrial operation and public roads, are considered part of the operating area.

Operators may be adversely affected by fires starting outside or inside their operating area, and thus have considerable interest in preventing and suppressing such fires. The operator has a responsibility to anticipate, plan for, and actively work to prevent as many of these wildfires as possible.

Some general fire precautions can apply equally to all types of industrial operating areas. These have been set forth in federal, state, and local regulations and contract requirements for the timber harvesting industry. They can be equally valid for mining, construction or drilling operations.

Hazards

Hazards are produced by most industrial operations as a by-product of their activity. Fire acceleration hazards that contribute most to increasing fire spread and intensity are slash, snags, spilled petroleum products, and piles of any kind of flammables.

Ignitable hazards should be removed from all high risk areas. These areas include, but are not restricted to: refueling areas; locations of stationary or portable engines: welding, cutting or grinding operations; and personnel assembly areas where smoking and/or lunch, or warming fires are allowed. They should be protected by creating clearings where all flammables have been removed. The width or radius of the clearing, in order to be effective, will vary from 10 to 25 feet depending on the nature and size of the risk. Under certain special high-risk situations, 50 feet or more should be considered.

Where such clearances are needed, they must not only be initially made, but also maintained.

What to look for:

- The presence of any ignitable hazards.
- Cleared zones around any ignitable hazards.
- Any high risk activities taking place near the ignitable hazards.

Inspection Frequency:

- Every year for fixed locations. Every month through the fire season, for those that are transient.

Smoking Areas

Most industrial operations have employees that smoke.

Some companies have designated smoking areas for smokers. The area should be cleared of natural vegetation, with a safe container to dispose of butts and ashes. For these companies, there should be company policy that prohibits smoking except in the designated areas.

Others allow smoking throughout the site. For these, there should be some company guidance or policies about smoking when fire danger reaches very high and extreme levels.

At the very minimum, smoking should not be allowed except in an area cleared to mineral soil, or other nonflammable base, with a minimum diameter of six feet.

What to look for:

- The presence of smoking and no-smoking areas.
- The company policy about smoking.
- Clearances around designated smoking areas.
- Ash/butt disposal cans in smoking areas.
- Appropriate signage.
- Fire extinguishers or fire suppression tools nearby.
- Evidence of smoking outside of designated areas or safe conditions.

Inspection Frequency:

- Every year for fixed locations. Every month through the fire season, for those that are transient.

Warming and Debris Disposal Fires

Industrial sites often have small amounts of debris in the area, and may utilize a small fire to dispose of such debris, or may build lunch or warming fires for their employees. These small fires can and do start wildfires. Lunch and warming fires are essentially campfires, but in an industrial, rather than a recreational setting. Unless built, maintained and extinguished properly, they are as dangerous in one location as the other.

Warming and debris disposal fires should never be built without first providing a clearing to bare mineral soil, or other nonflammable base, for a minimum distance of 10 feet in all directions, from the expected perimeter of the fire. The fire should not be permitted to

become any larger than actually needed to cook or provide warmth. The fire should never be left unattended, until it is totally extinguished. There should be no overhanging branches.

Warming and debris disposal fires may require a burn permit, if the reservation has a burn permitting system.

Firefighting tools, especially a long-handled, round-point shovel, should be readily available in the immediate vicinity at all times, while the fire is burning or glowing. Larger debris disposal areas may also need to have a water hose with sufficient volume to extinguish or cool the pile. When done, the fire should be extinguished with water, just like a campfire.

There should be one person assigned to making the fire safe.

What to look for:

- The presence of lunch, warming or debris disposal fires.
- The company policy about managing these fires.
- Clearances around designated fire pits.
- Appropriate signage.
- Fire suppression tools and water nearby.
- Evidence of additional fire pits outside of designated areas.

Inspection Frequency:

- Every year for fixed locations. Spot check every month through the fire season, for those that are transient.

Welding, Grinding, and Cutting

Industrial operations frequently have to repair and maintain equipment. This can involve welding, cutting, and grinding parts. All of these actions can start a wildfire. If they are conducted in a fixed location; it should be cleared of burnable vegetation for a radius of 35 feet. There should be an appropriate fire extinguisher readily available. The recommended type is a multipurpose ABE powder type. At a fixed location, a 5 lb. extinguisher is recommended. Alternatively, water works on the vegetation if ignited, but is not for use on or near an arc welder.

Welding, cutting, and grinding are often done as emergency repairs, to get a disabled machine moving again. This means that the choice of time and location is severely limited or nonexistent. The machine may very well be situated in the middle of a hillside, covered with dry grass or pine needles. Before any arc is struck or other repair work started, the area should be made as fire safe as possible. All flammable vegetation and other fuels should be removed for a minimum radius of 10 feet from the area to be worked in. Several companies regularly provide 25 feet clearance. Also, firefighting equipment, including a backpack

pump water type fire extinguisher, and shovel, should be provided close by (i.e., less than 25 feet from the activity). When fire danger rating is "Very High," or when high winds prevail, a larger clearing radius should be employed. When fire danger conditions are “Extreme” or “Critical”, welding, cutting and grinding activities should be postponed. Whenever welding, cutting or grinding is done in the field, a “fire watch” should be at the scene, during the operation and left at the site, for at least one hour after the completion of the repair. A welder wearing a hood or dark goggles can seldom see a vegetation fire. During high fire danger periods, industrial fire precaution levels may prohibit this activity during certain hours.

Spark arrester and clearing requirements are applicable to portable generators, supplying power to arc welders and grinders. It should also be remembered that the operator will not lose his/her responsibility and liability, although may share it, by using an independent contract welder rather than an employee. The operator must be sure the professional welder is aware of, and follows fire safe practices and complies with the law, lease provisions, or other regulations.

What to look for:

- The presence of fixed equipment repair areas.
- The presence of fire suppression tools, fire extinguishers and water at fixed repair areas.
- The company policy about “in the field” repairs.
- The company policy about operations when fire danger is “Extreme” or “Critical”.
- Check vegetation clearances at fixed repair areas.

Inspection Frequency:

- Every year for fixed locations. Spot check every month through the fire season.

Refueling areas

Whenever possible, refueling should be done in a centralized fixed location, prepared and maintained for that purpose. Flammable vegetation should be cleared for a 25 to 50 ft. radius. Fire suppression equipment should be located in the immediate vicinity of the fueling apparatus. Fire extinguishers should be rated as Class B and should be at least 10 lbs. Fuel pumps, if present, should be fitted with automatic shutoff nozzles and an emergency pump shutoff.

Most heavy equipment is refueled on location by a service truck. This truck should be equipped with some fire suppression equipment (shovels and rakes) as well as an

appropriate sized Class B Fire Extinguisher. When possible, the area around the equipment should be cleared to mineral soil for an area of at least 20 ft. radius.

Most small engines, such as chainsaws, pump and generator motors, are refueled on location. There should be a circular area cleared to mineral soil of about 10 ft. radius, designated for refueling these small engines. There should be a small Class B fire extinguisher kept at this location. Fuel should only be stored in labelled, approved storage cans, of a size that makes the refueling operation manageable.

What to look for:

- The presence of fixed refueling areas.
- The presence of fire suppression tools, fire extinguishers and water at fixed refueling areas.
- The company policy about "in the field" refueling.
- The company policy about refueling operations when fire danger is "Extreme" or "Critical". The shutoff devices on powered pumps.
- The signage about smoking, engine off, and cell phone use.
- The fire suppression equipment and extinguishers on the fuel service truck.
- The appropriate fuel cans for small engines.
- Check vegetation clearances at fixed refueling areas.

Inspection Frequency:

- Every year for fixed locations. Spot check every month through the fire season.

Access roads

The access roads to the work site are another potential source of ignitions on industrial operations in the wildlands. Since most of these operations are temporary or sporadic, the roads onto the site are often ignored. Deep ruts can cause vehicles to "high-center", bringing exhaust systems in contact with wildland fuels. This is an area the prevention inspection should include.

What to look for:

- Deep ruts over grassy fuels.
- Large rocks in the road bed that might be a source for sparks.

Inspection Frequency:

- Every year for fixed locations. Spot check every month through the fire season.

Parking areas

Industrial operations in the wildlands have workers. These workers will normally commute to the work site in their personal vehicles. Equipment must be parked overnight. These parking areas can represent a fire ignition hazard.

Parking areas for the personal vehicles should be bare soil, gravel or closely mowed areas.

Heavy equipment parking should be in a cleared area, with bare mineral soil or gravel. Heavy equipment should be observed 10 to 20 minutes after it is parked, in case debris accumulations that were smoldering during use, ignite and set the equipment on fire.

What to look for:

- The signage designating the parking area.
- Bare mineral soil or gravel for heavy equipment parking.
- Bare mineral soil, closely mown grass or gravel for personal vehicle parking.
- Fire suppression equipment (Water handling equipment or a 20 – 30 lb. multipurpose type extinguisher) in close proximity to the parking areas.

Inspection Frequency:

- Every year for fixed locations. Spot check every month through the fire season.

Temporary on Location Housing

Sometimes, industrial sites will be so remote, that temporary housing is provided for employees, on the work site. These temporary housing areas should be treated and inspected as if they were recreation areas or campgrounds.

Overall Operating Areas Summary

When the operating area has been inspected, a summary report should be provided to the operator.

What to Document:

- The extent of the operating area inspected, with date and time. This is normally on a map.
- The latitude and longitude of each location or process inspected.
- The individual locations on the map where risks or hazards are identified.
- Any specific issues /hazards identified with location, date, time and photograph.
- Include photographs and photograph log with the inspection records.

- If other inspections, such as equipment or power line inspections, include those in the operating area documentation.

What to Report:

- The processes and locations in the operating area that were inspected.
- Any specific issue /hazard identified with any location or process.
- Provide a photograph.
- Provide recommendations for corrections.
- Provide the date and time of the inspection, along with the inspector's name and contact information.

Provide a copy of the report to the operating company and Agency/Tribal lease or sale compliance officer.

A copy of the Operating Area Inspection Record is found under Inspection Records.

RECREATION AREAS AND CAMPGROUNDS

Fire prevention inspections in recreation areas are specialized and necessary for public safety.

Planning for inspections in recreation areas, including loss prevention, should begin before any increased wildfire potential or anticipated high use impact by the public. Regardless of the scope or complexity of the recreation area, inspections are a fundamental part of any recreation area wildfire prevention effort.

The NWCG publication *NWCG Standards for Wildfire Prevention: Recreation Areas and Patrols* provides an excellent evaluation tool, for inventorying the ignition risks at a campground/recreational site. A copy has been included with the Campground Inspection Record. Their entire publication can be found online at: https://www.nwcg.gov/sites/default/files/publications/pms456.pdf.

Recreation areas can be categorized based on their expected pattern of use. Different site types have unique patterns of use that require special consideration when planning inspections.

Developed Recreation Sites

Developed recreation sites include permanent facilities such as roads, trails, toilets, visitor centers, camping areas, recreational vehicle pads, cabins, and other facilities needed to accommodate recreation use over the long term. These sites require continuing commitment and regular maintenance. Developed recreation sites include the frontcountry (outdoor areas that are easily accessible by vehicle and mostly visited by day users) and wildland/urban interface areas (WUI). For the purposes of this publication, the frontcountry and WUI sites are categorized with developed recreation.

Prevention inspection efforts should target campfires rings, cooking fire pits, grills and grates, signage, electrical connections, parking areas, vehicle and towing safety, and off-road vehicle use.

What to look for:

- Signage designating the use of roads, parking areas, and off-road vehicles.
- Signage concerning dragging tow chains and smoking material disposal.
- Permanent campfire pits or rings with cleared mineral soil for a 10 ft. radius.
- Cooking pits and permanent charcoal grills with cleared mineral soil for a 10 ft. radius.
- Defensible space and appropriate storage of flammables around permanent structures.
- Ash disposal cans or pails, with signage.

- Electric connections that are exposed or have signs of arcing.

Inspection Frequency:

- Every year prior to seasonal use, and again prior to the fire season.

Dispersed/Undeveloped Recreation Areas

Dispersed or undeveloped recreation areas are used for activities such as primitive camping, hunting camps, day use, etc., but are not specifically developed for that purpose. Facilities are usually temporary in nature, designed to minimize resource damage, and provided for short-term use. Although little or no investment may have been made at these areas, they should be periodically inspected.

Prevention inspection efforts should target campfires, cooking fires, vehicle and towing safety, parking enforcement, and off-road vehicle use.

What to look for:

- Signage designating the use of roads, parking areas, and off-road vehicles.
- Signage concerning dragging tow chains.
- Permanent campfire pits or rings with cleared mineral soil for a 10 ft. radius.
- Cooking pits and permanent charcoal grills with cleared mineral soil for a 10 ft. radius.

Inspection Frequency:

Every year prior to seasonal use and again prior to the fire season.

Recreation Area/Campground Summary

What to Document:

- The extent of the recreation area inspected, with date and time. This is normally on a map.
- The latitude and longitude of each campsite or feature inspected.
- The individual locations on the map where risks or hazards are identified.
- Any specific issues /hazards identified with location, date, time and photograph.
- Include photographs and photograph log with the inspection records.
- If other inspections were conducted, such as equipment or power line inspections, include those in the recreation area documentation.

What to Report:

- All of the campsites and other features in the recreation area that were inspected.
- Any specific issue /hazard identified with any location or feature.
- Provide photographs.
- Provide recommendations for corrections.
- Provide the date and time of the inspection, along with the inspector's name and contact information.

Provide a copy of the report to the operating company if leased and Agency/Tribal lease compliance officer. If the site is tribally operated, provide the report to the tribal manager for the site.

A copy of the Campground Inspection Record is found under Inspection Records.

OIL AND GAS WELLS

Many reservations have active oil and gas wells. These are particularly common in the Plains, but also occur in other areas. The greatest hazard is associated with the presence of methane and/or hydrogen sulfide, both are highly flammable.

Many laws and regulations apply to oil and gas well drilling and operations. Most of these laws and regulations relate to safety of workers and the environment during drilling operations. The fire prevention inspector should focus on those activities at the well site that could result in a vegetation fire.

Safety Note:

Oil and gas wells often have hidden dangers in the form of toxic and flammable gasses. Some common gasses present at these locations include hydrogen sulphide (H_2S); methane (CH_4); and, carbon monoxide (CO). All of these have different symptoms and effects. If they are present, the well pad should be visibly marked for the gasses present. These sites can normally be safely inspected from a distance, if approached from upwind. If it is necessary to get a closer look, contact the servicing company or operator. **Do not enter these sites without the required personal protective equipment, even in a vehicle.**

The U.S. Department of Labor provides an excellent basic resource to learn more about oil and gas well safety. Their Oil and Gas Well eTool is available at: https://www.osha.gov/SLTC/etools/oilandgas/general_safety/general_safety.html.

There are two general phases of operations with oil and gas wells; drilling, and operations.

Drilling Phase

This phase of the oil and gas well does not provide much opportunity for wildfire prevention inspections.

Most wells being drilled today are deep wells. These deep wells require large drilling rigs. They are heavily regulated and when properly operated, present little wildfire threat that can be prevented through inspections. Inspections during drilling operations are excessively dangerous and should not be conducted except in times of extreme fire danger, and then only when accompanied by the toolpusher or rig superintendent.

The well pad is usually a rectangular cleared area from ½ to 3 acres, depending on the size of the drilling rig. Sometimes this pad will be covered with gravel. It provides a sufficient safety zone for any embers or other sources of ignition associated with the drilling operation.

In the very rare cases, where the employees are housed at the drill site, the housing area should be inspected as if it were a recreation area.

Figure 4-Modern Drilling Rig

Operations Phase

Once the well is drilled and enters pumping, there are more opportunities for wildfire prevention inspections to make a difference.

The access roads, well pad maintenance, power supplies, pump motors and flare stacks (if present) all present opportunities for inspections to prevent wildfires.

What to look for:

- On the access roads and well pad, look for deep ruts over grassy fuels and large rocks in the road bed that might be a source for sparks.
- If the pump motor is electric, look for a buried power cable.
- Overhead distribution lines, connections and transformers.
- If the pump motor is an internal combustion engine, check the exhaust system to verify it points in a safe direction. Often these engines will not be equipped with spark arresters. Spark arrester requirements can vary by locality and will need to be researched locally.
- If the well is equipped with a flare stack, check to ensure it is at a safe height and is in an area free of flammable vegetation.

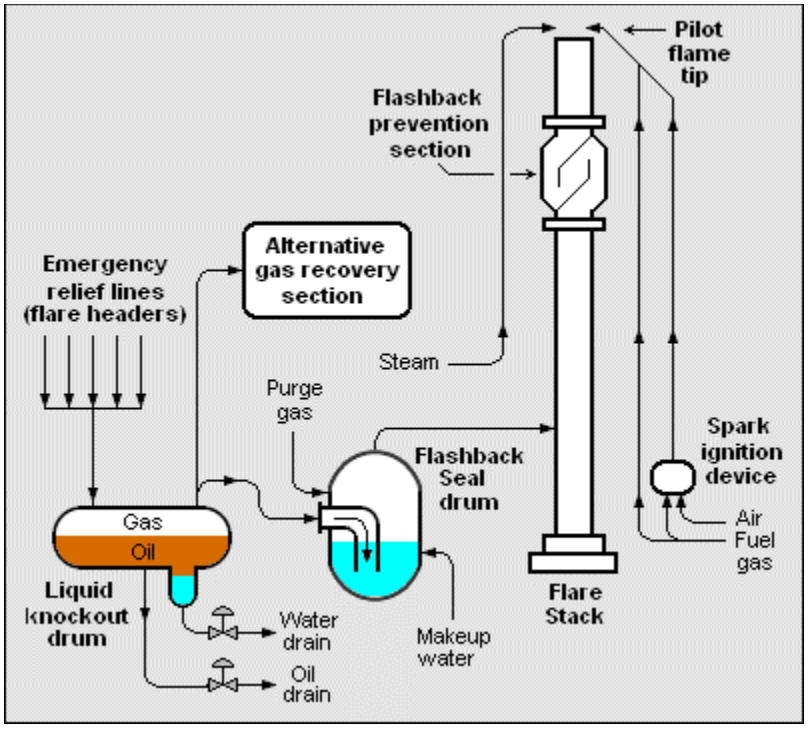


Figure 5- Flare Pipe Diagram

By Mbeychok - Own work, CC0,

Inspection Frequency:

If the reservation has a large number of wells, they should be inspected on a rotating schedule so that each well is inspected every three years. If there are only a few wells (less than 50) they should be inspected annually.

What to Document:

- The location of the oil/gas well inspected, with date and time. This is normally on a map. Include the latitude and longitude.
- The individual locations on the map where risks or hazards are identified.
- Include photographs and photograph log with the inspection records.
- If other inspections, such as equipment or power line inspections, include those in the documentation.

What to Report:

- Any specific issue /hazard identified with the well operations at the location.
- Provide photographs.
- Provide recommendations for corrections.
- Provide the date and time of the inspection, along with the inspector's name and contact information.

Provide a copy of the report to the operating company and Agency/Tribal lease compliance officer.

A copy of the Oil Field Site Inspection Record is found under Inspection Records.

RAILROADS

Railroads operations can, and do start wildfires. Some of these wildfires can be prevented through an established inspection program. Railroad fire prevention inspections are made by both the railroad companies and by the fire protection agencies. The reasons for, and the timing of, these inspections may differ, but advantages to both parties can often come from making joint inspections.

The responsibility for inspecting their rights-of-way (R/W) and rolling stock for compliance with laws and regulations, maintenance of uninterrupted traffic and avoidance of civil liability rests exclusively with the railroad companies. It is the responsibility of the management personnel of each company to determine how, when and by whom its inspections will be carried out.

There is no standard answer to the question of how often inspections should be made, due to several variables. Each company must determine its own appropriate inspection schedules, which will probably differ between divisions, at least for R/W inspections. Some company rules establish inspection schedules and procedures, either more frequent or more intensive than those required by federal or state laws and regulations.

The BIA/Tribal fire programs are charged with the responsibility of protecting the public from loss of life, property and resources by fire. To accomplish these missions, inspections are necessary for railroad property and equipment in order to prevent wildland fires. The BIA/Tribal fire programs also have a duty to make known to railroad companies those violations and defects noted during their inspections.

Due to safety and legal concerns, inspections of railroad equipment must only be conducted with a company employee present. Inspections of R/W may be conducted without a company employee, as long as they are not conducted from the tracks.

The NWCG offers a free online course on Investigating Railroad Caused Fires. This course is an excellent resource for developing a railroad inspection strategy. It is available at: https://onlinetraining.nwcg.gov/node/216.

CALFire also offers an excellent resource guide on Railroad Fire Prevention. It can be found online at: http://cdfdata.fire.ca.gov/pub/fireplan/fpupload/fppguidepdf100.pdf.

For the purposes of wildfire prevention inspections, it is useful to divide the inspection of railroads into three types: equipment; tracks; and right-of-ways. Typically, most inspections will be focused on right-of-ways.

Equipment

For railroad fire prevention inspections, equipment generally means locomotives. Modern locomotives are diesel-electric. In the United States, there are two major manufacturers of engine power plants: Electro Motive Division (EMD) and General Electric (GE). There are also two major types of diesel power plants: normally aspirated and turbo-charged. Nearly all fire prevention inspections of locomotives will be focused on the exhaust system.

Normally aspirated motors will have a spark arrester on the exhaust system. This spark arrester can be of cup or retention bin type. There should be one spark arrester for each exhaust stack. Inspection of these requires the diesel motor to be shut down and cool. These inspections should only be conducted with a qualified railroad employee.

Turbo charged motors will have eductor tubes located on the top of the locomotive, normally in the exhaust stack. These can be visually inspected from the top of the locomotive, if not obstructed by a silencer or muffler. An additional inspection point on this system are the flex tubes. These also need to be examined for leaks. Again, the removal of any parts must be done by a qualified railroad employee.

Another, less common, inspection point are the brakes. Due to the high number of brake shoes that may need to be inspected, this type of inspection should be limited to times when there is a suspected malfunction. Today's brake shoes are composite lined. The composite material is not a recognized source of ignitions. However, when the composite material wears down so that there is contact between the metal backing plate and the metal wheels, there is a significant opportunity for ignitions related to braking. The shoes on most carriages should be able to be visually inspected.

What to look for:

- Check spark arresters on naturally aspirated engines. Remove the caps and collect any carbon that falls out. A well-functioning spark arrester should have some carbon particles, if an excessive amount is present, inquire about the last cleanout. The recommended cleanout schedule is about every 5 to 7 days.
- Check the eductor tube, shroud, and muffler (if present) in the exhaust stacks for excessive carbon buildup. Inquire about maintenance records and frequency of servicing. The recommended service schedule is 10 to 15 days.
- Check the brake shoes pads or disc brake pads for signs of metal on metal contact.

Inspection Frequency:

Since railroads are among the most regulated industries in America, inspections of their equipment should be limited to times where railroad equipment is suspected of starting fires.

Tracks

The tracks for railroads can be a source of wildfire ignitions. Most commonly these ignitions occur during track maintenance, which is difficult if not impossible to effectively inspect. Other issues with the tracks are switches. In rare instances switches can malfunction or short out. Again inspections of these are unlikely to reveal any issues that will prevent wildfires.

Right-of-Ways

Right of Ways (R/W) are not inherently an ignition threat. However, when not maintained, they provide a highly receptive fuel bed for hot carbon and metallic materials cast from the locomotives and passing rail cars. Clearance standards vary by the type of grasses and other vegetation growing in the R/W. They also vary by the grade and shape of the track at any given location.

A general rule is for a vegetation free zone to extend at least 12 ft. from the nearest rail. If there are tall grasses in the R/W; then the clearance distance should be wider. Studies in California indicated a minimum clearance needed in some situations was 25 ft. from the nearest rail. The wildfire prevention inspector should discuss R/W clearance standards with the owner of the railroad line to determine what their standard is. If there are few or no problems related to the R/W; then their standard is acceptable.

Measuring the clearance is another challenging issue. There will always be some minor intrusions on any cleared zone. To be fair and still effective, the inspection should focus on average conditions. A useful technique for this is to divide the length of R/W being inspected into $1/10^{th}$ mile segments (roughly 530 ft.), then describe the average conditions in each segment. The segments should be numbered using a system used by the railroad.

Locations on railroad R/W are best identified by use of the milepost (MP) number. These numbers are indicated on special signs at one-mile intervals along all common carrier railroad R/W. More precise locations between the mileposts are given on different railroads by either pole number, decimal or fraction of a mile. Pole number refers to the telephone poles that parallel most tracks. They are indicated in writing with the MP number followed by a slant (/) followed in turn by the pole number (e.g., 237/20: The 20th pole beyond MP 237). Decimals and fractions are self-explanatory and are indicated by their usual mathematical symbols. **Agency/Tribal inspectors should only use the type designation used by the particular railroad company being inspected.**

Inspections of the R/W can be done from a 4x4 pickup, if there is a maintained side road along the R/W. A Utility Terrain Vehicle (UTV) may be used when the R/W is passable, with enough of a safety zone for passing trains. In some situations, inspections may need to

be conducted on foot. The best approach is to work with the railroad to establish a safe time and method to conduct R/W inspections. Joint inspections are always best.

What to look for:

- The average clearance distances, measured from the nearest rail to the edge of flammable vegetation.
- Overgrown areas in the R/W.

Inspection Frequency:

R/W inspections are most useful when conducted prior to the beginning of fire season, to allow the railroad time to respond before there is a significant threat.

Railroad Summary

With railroads, most inspections are of the right-of-ways

What to Document:

- The extent of the right-of-way or tracks inspected, with date and time. This is normally on a map.
- The latitude and longitude and rail miles of each feature inspected.
- The individual locations on the map where risks or hazards are identified.
- If equipment was inspected, document the type, identification number and location where it was inspected along with the results of the inspection.
- Any specific issues /hazards identified with location, date, time and photograph.
- Include photographs and photograph log with the inspection records.
- If other inspections were conducted, such as equipment or power line inspections, include those in the railroad track documentation.

What to Report:

- Prepare a summary of all of the right-of-way and other features that were inspected.
- If equipment was inspected, report the identification number and physical location where it was inspected.
- Designate any specific issue /hazard identified with any segment or feature.
- Provide photographs.
- Provide recommendations for corrections.
- Provide the date and time of the inspection, along with the inspector's name and contact information.

Provide a copy of the report to the operating company if leased and Agency/Tribal lease compliance officer.

TARGET RANGES

Target ranges on Indian Lands represent an inspection challenge. Safety of the inspector is the first priority. It is a good idea to contact the Range Master or Range Safety Officer prior to the inspection and request they accompany the inspector. If there is no Range Master or Range Safety Officer, a law enforcement officer should be requested to assist with the inspection.

Most formally designated outdoor gun ranges are unstaffed. Maintenance is provided by the owner or membership. For an inspection to be effective, the inspector must contact whoever maintains the range, of any issues identified during the inspection.

What to look for:

- Cleared zones down range from the handgun shooting stations of at least 25 ft. to the edge of flammable vegetation. A 50 ft. zone is desirable for rifles. Primitive arms rifles may need to have a 75 ft. cleared area.
- If the range allows exploding targets, look for a cleared area for the targets to be set up. It should be at least 100 ft. in diameter.
- "No-Smoking" signs on the firing line.
- Parking areas that have grass mowed low, or are gravel.
- If the range is staffed, look for a fire extinguisher or fire suppression tools.

Inspection Frequency:

Target range inspections are most useful when conducted prior to the beginning of fire season.

What to Document:

- The location of the target range inspected, with date and time. This is normally on a map. Include the latitude and longitude.
- The individual locations on the map where risks or hazards are identified.
- Include photographs and photograph log with the inspection records.
- If other inspections, such as equipment or power line inspections, include those in the documentation.

What to Report:

- Any specific issue /hazard identified with the target range.
- Provide photographs.

- Provide recommendations for corrections.
- Provide the date and time of the inspection, along with the inspector's name and contact information.

Provide a copy of the report and inspection record to the range operator or sponsor. Also, provide a copy of the report to the permitting official.

DUMPS

There are two types of dumps on trust lands: legal and illegal. Legal dumps are normally operated by a commercial management company, or a municipal, tribal, or county government. In each case, there is someone responsible for the operation. They will have regulations and industrial standards in place to protect the environment, workers and neighbors.

Illegal dumps are more difficult and dangerous to inspect. Once inspected, it can be very difficult to identify a responsible individual. Sometimes the responsible individual may be a tribal or federal employee. Those responsible for the dump may not even know of its existence. When an illegal dump is found, the adjacent area should be scanned for fire breaks, and signs of recent use. Since this is an unregulated, illegal site, the inspector must be mindful of the potential for the presence of criminal evidence or toxic waste. Initial inspections should be made visually, from a safe distance. The dumping activity should be reported to the landowner, tribal or BIA officer responsible for land operations, and law enforcement.

Illegal dumps

What to look for:

- Signs of recent use.
- Any fire breaks around the dump.
- Recent fire activity.
- Materials that could spontaneously combust.

Legal Dumps

What to look for:

- Defensible space around the perimeter.
- Ladder fuels adjacent to the site.
- Evidence that management burns woody debris, and vegetation.
- Heavy equipment that may need inspection.
- A tall fence to collect blowing paper.

Inspection Frequency:

Conduct initial inspections at any time. Annual follow-up inspections should be conducted prior to fire season each year.

What to Document:

- The location of the dump inspected, with date and time. This is normally on a map. Include the latitude and longitude.
- The individual locations on the map where risks or hazards are identified.
- Include photographs and photograph log with the inspection records.
- If other inspections were conducted, such as equipment or power line inspections, include those in the documentation.

What to Report:

- Any specific issue /hazard identified with the dump.
- Provide photographs.
- Provide recommendations for corrections.
- Provide the date and time of the inspection, along with the inspector's name and contact information.

TIMBER HARVESTING OPERATIONS

Historically, the timber harvesting industry has been responsible for fires, including some of the most devastating and costly in American history. Over the years, the record has been significantly improved. Considering the fact that the timber industry is operating continuously, in a highly vulnerable environment, timber harvesting operations cause remarkably few wildfires.

With only a few exceptions, fires caused by timber harvesting operations, are the result of ignorance or carelessness. The fully informed and conscientious operator or employee will not willfully risk a fire. Too much is at stake. On the other hand, new or poorly trained employees can unknowingly cause fires.

OSHA provides an excellent Logging eTool on timber harvesting available at: https://www.osha.gov/SLTC/etools/logging/userguide.html.

Common Logging Equipment

The heavy equipment used in timber harvesting is not basically different from that used by the construction and surface mining industries. Examples are skidders, forwarders, loaders, and feller-bunchers. Additional forestry related equipment includes chippers, masticators, and portable sawmills. The risks for timber harvesting and forestry equipment are greater, since they are operating almost continuously over, and through flammable wildland fuels. Construction and mining equipment, on the other hand, are usually working in the hazardous environment only during the pioneering stages of a project or operation. Consequently manufacturers, distributors, owners, and agency inspectors have all devoted a great deal of attention to the reduction of the fire-starting potential of logging machines.

Spark Arresters

Exhaust sparks may be a fire risk from logging machinery. This explains the requirement in laws and timber sale contracts for spark arresters on all exhaust stacks, not only the main engine, but starting and other auxiliary internal combustion engines as well. Because the rapidly turning drive blades of a turbocharger tend to chew carbon particles into dust, and thus act as an attrition spark arrester; such turbochargers are usually accepted in lieu of spark arresters. This practice should not be followed automatically.

Note that the exhaust systems on certain makes and models of engines are so designed that only a portion of the exhaust gases pass through the turbocharger, the rest being bypassed directly into the exhaust stack and thus receiving no spark arresting treatment. These machines, even though turbocharged, should be equipped with spark arresters.

The spark arrester on a finely tuned machine should be cleaned every 30 to 40 operating hours. The proper way of doing this is to park the machine on a landing or other large cleared area, remove the band or plug, start the engine and rev it up to blow out the carbon, shut down the engine and replace the band or plug. It should be remembered that

some units may require two spark arresters: one for the diesel engine, and one for the gasoline starter engine.

Occupational Safety and Health Administration (OSHA) regulations require most new equipment to be fitted with mufflers or silencers. Some operators and owners are convinced that an internal combustion engine, cannot operate efficiently with both a muffler, and a spark arrester affixed to the exhaust stack, because too much back pressure is created. This is not necessarily so, provided the proper model and size of both is utilized. Many new machines come factory equipped this way and older machines can be successfully retrofitted if properly engineered.

Figure 6 -Rubber tired skidder

Other Ignition Risks

Another fire risk, particularly with log skidding equipment (e.g., tractors and rubber-tired skidders), is the collection of flammable debris inside the engine compartment, particularly on the exhaust manifold or in the belly pan. The danger of the former location is obvious. Debris in the belly pan restricts cooling of crankcase oil, hydraulic fluid and engine cooling water and causes engine overheating. In addition, it forms a fuel bed to which access, for extinguishment of a fire ignited from any source (e.g., exhaust sparks, flaming or glowing material falling from the exhaust manifold or electric short) is almost impossible. For both reasons, machines designed for use in the logging industry

by all manufacturers in recent years have had the engine compartments enclosed by plates and/or screens. These should always be kept in place while the machine is being operated. Some operators and mechanics fail to replace them after servicing or repairing equipment, but they are creating more problems than they are solving when they do this. In fact, it would be good practice to retrofit older machines with these screens. Those machines which are not so equipped should have all debris removed from the engine compartment, especially the belly pan, regularly and often. Once a day or at every refueling is recommended.

Every piece of mobile equipment used for yarding and loading logs should be equipped with a readily accessible fire extinguisher, and should be required to have a long-handle, round-point shovel for fire suppression. The extinguisher should be at least a 10 pound multipurpose (ABC) dry-powder type. All extinguishers and tools must be in compliance with regulations.

Recommended Fire Prevention Practices for Timber Harvesting Equipment

The Timber Harvesting and Transportation Safety Foundation recommends the following fire prevention practices:

1. Perform daily and routine maintenance and service as recommended by manufacturer.
2. Use only qualified operators who have been trained to use fire suppression equipment.
3. Clean unit often!
    a. Clean out engine and mechanical compartments of accumulated debris at least once a day. During heavy leaf fall or dry periods, clean as often as necessary.
    b. Drop belly pan and remove side shields to clean and remove accumulated leaves, debris, oil, grease, spilled fuel, etc. from engine and transmission compartments at least once a week.
    c. Steam clean or pressure wash unit at least once a month.
4. Inspect battery cables and connections, as well as electrical wiring, connections, and components at least weekly. Repair or replace any defects in electrical system.
5. At shutdown, engage battery disconnect switch, if available on unit.
6. Maintain and regularly service the engine and hydraulic cooling system to avoid overheating.
7. Remove flammable items from operator’s compartment.

8. Do not transport flammable liquids on the machine: gas, oil, or diesel.
9. Before fueling, shut off engine. Do not smoke within 50 feet of fueling areas.
10. When parked at shutdown, maintain at least 50 feet between machines in an area cleared of excess ground debris to minimize the spread of fire.
11. Observe machines for 15 to 20 minutes after shutdown to ensure proper cool down.
12. Maintain all protective shields, screens, belly pans, and covers to reduce the accumulation of flammable debris inside machine compartments.
13. Immediately clean fuel, oil, and grease spills.
14. Prior to using a cutting or welding device, clean the machine and, if necessary, wet the work area down with water. Have a fire extinguisher present during this work.
15. Maintain an approved, charged, and operable fire extinguisher when parked at shutdown.
16. Place company name and phone number on equipment.

What to Look For

- Check maintenance logs for regular and up-to-date maintenance.
- Is the machine in a reasonably clean condition, considering the operating environment?
- Is the engine compartment cleaned of debris or excessive oil and fuel accumulations?
- Is there a battery disconnect switch on the machine?
- Is wiring in good condition, insulation pliable and unbroken, and splices properly wrapped?
- Is wiring secured away from moving parts and exhaust systems?
- If required, are spark arresters clean and functioning, with no modifications?
- Are there any leaks in or modifications to the exhaust systems?
- Has the belly pan been cleaned in the past week?
- Are hydraulic lines secured away from moving parts or exhaust systems?
- Have bearings and bushings been lubricated according to scheduled maintenance?
- Are excessive flammables present in the operator compartment?
- Is a charged, usable, 10 lb. or larger, multi-purpose ABC or a Class C fire extinguisher on the machine?

Inspection Frequency:

Check each piece of equipment annually, near the beginning of the fire season. Additional inspections may be needed if frequent wildfires are associated with the operation.

Cable Systems

Cable logging systems are rarely used in Indian Country. They are found primarily in the Northwest and Pacific Regions. They are composed of yarders, cables and usually blocks. They are rigged in three basic configurations (ground lead, high lead and skyline) with many variations of each. Their primary use is for logging areas that are too steep for skidder or tractor logging. This means that they are found in topography where fire suppression is very difficult and expensive. Therefore, fire prevention is of utmost importance.

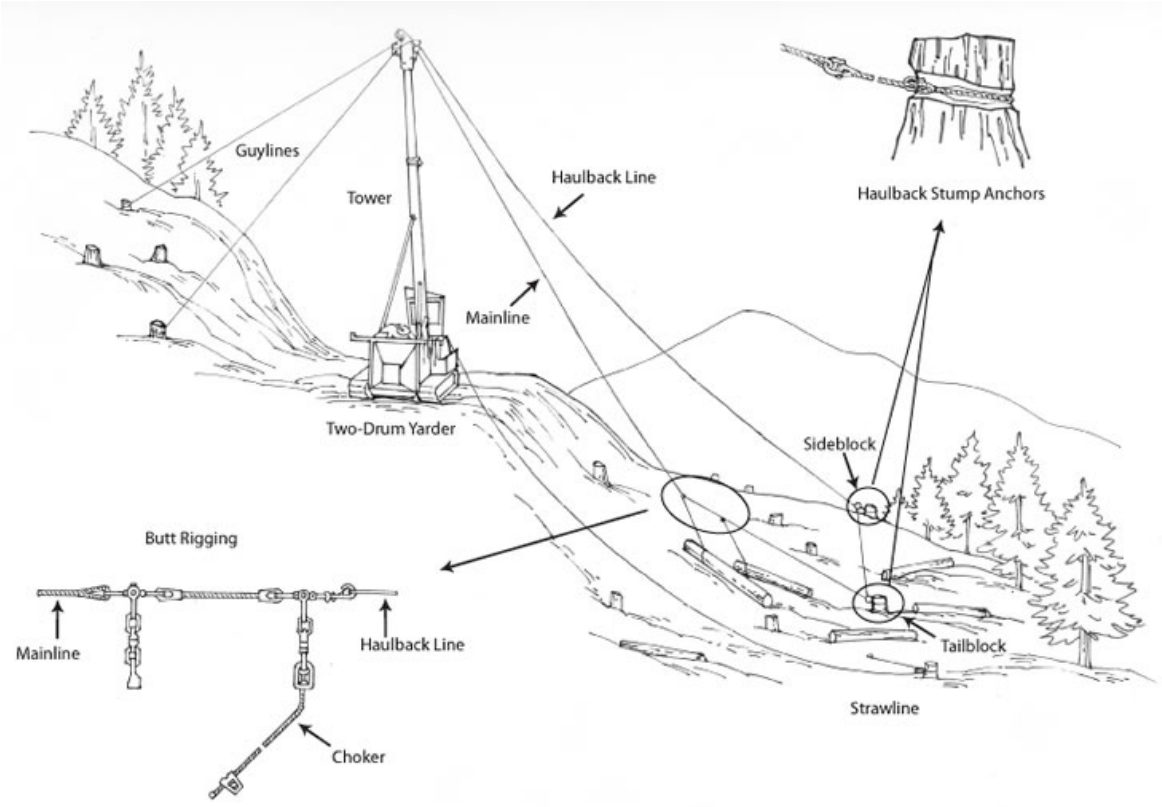


Figure 7-Highlead Logging System

The yarder is generally the least dangerous part of a cable logging system from a fire risk standpoint, but it cannot be ignored. A yarder is composed of an internal combustion engine, providing power to a winch, with one to four drums and a boom or tower. In some systems, the tower is separate. Even though the yarder normally operates in a semi-permanent location (e.g., a landing) which is relatively free of flammable vegetation, the exhaust

system is dangerous and is required to be spark arrester equipped. The same recommendations for cleanliness and preventive maintenance apply to this piece of mechanical equipment as to any other. Some special areas where excessive friction that can cause fires are: the cable drum brakes, and the blocks or sheaves on the boom or tower. Fire extinguishers and firefighting tools should be required on, or close to the yarder.

The cable, being made of steel, and except for a standing skyline, traveling at high rates of speed, can create very high frictional heat in anything it rubs against. On live green vegetation this will normally not cause a fire. However, many wildfires have been started by cables rubbing against dead woody material, including standing snags, down logs or trees, stumps, dead branches on live trees, etc. Therefore, it is of the utmost importance that all moving cables be laid out, and rigged in such a way as to avoid contact with dead woody material at all times, during the initial setup, and throughout use.

A special problem is presented by skylines and, to a lesser extent, high leads. The towers and booms occasionally act as lighting rods. Telescoping or hinged towers, and booms, should be lowered when the system is left idle, or when thunderstorms are present in the area, to avoid lightning ignitions.

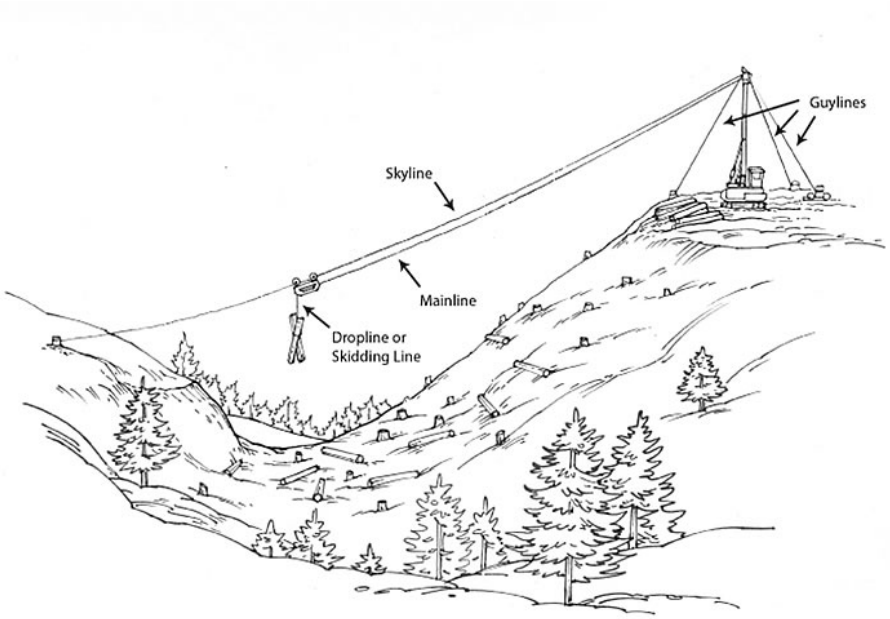


Figure 8 - Skyline Logging system

Skyline cable systems having motorized carriages must be inspected for spark arresters. There is not a great fire risk here, but as with any internal combustion engine, it will require an arrester. Some carriages may be equipped with manual/automatic fire suppression systems in the event of a malfunction that causes the carriage to strike the ground. Since

these carriages will have a fuel supply (although not large), and a battery, the intent of the fire suppression system is to activate upon impact and extinguish a fire caused by sparks and fuel.

These extinguishing systems are not 100% dependable, but are an attempt by industry to prevent fires. When inspecting carriages, the fire suppression systems are the same as are found in heavy ground equipment.

The parts of a cable logging system with the highest fire risks are the blocks. Depending on their position and purpose, these may be known as tail blocks, haul-back blocks, corner blocks, etc. So many fires have started at blocks that some protection agencies have special regulations regarding them, and many timberland owners have special timber sale contract clauses about them. Common causes of fires at cable blocks are frozen bearings, dead wood, jammed between the cable and the block and the block resting on flammables. The most common requirements are for clearing to mineral soil for a radius of 15 feet from a point directly below the block, and the placing of firefighting equipment (usually a shovel and a backpack pump or fire extinguisher) nearby.

For more information of the limitations and mechanics of a cable logging system refer to the Forest Service's on-line reference on Cable Logging Operations at: https://www.fs.fed.us/forestmanagement/equipment-catalog/cable.shtml.

What to Look For

- Check maintenance logs for regular and up-to-date maintenance.
- Clearance to mineral soil for a 15-20 ft. radius directly below the blocks.
- Check for spark arresters on skyline carriages.
- Check for friction points along the cables.

Inspection Frequency:

- Check each piece of equipment annually, near the beginning of the fire season.
- Re-inspect the system following each relocation.
- Additional inspections may be needed if frequent wildfires are associated with the operation.

What to Document on Timber Harvesting Inspections:

- The date, time, location, inspector's name, company name, and the names of any company employees helping with the inspection.

- The make, model, equipment number and VIN/Serial number for each piece of equipment inspected.
- Any issues with the equipment that need to be addressed.
- Any equipment that is unsafe to use.
- Take photographs of repairs needed.

What to Report:

- The date, time, location, inspector's name, company name, and the names of any company employees helping with the inspection.
- The make, model, equipment number and VIN/Serial number for each piece of equipment inspected.
- The issues with each piece of equipment that need to be addressed. Also report if there were no issues.
- Any equipment that is unsafe to use.
- Provide photographs of repairs needed.
- Reports can be copies of the inspection forms or a written letter/notice to the company, detailing the specifics of the inspection or both. The lease/sale compliance officer may choose to provide the written correspondence to the company.
- Reports should be provided to the company and to the lease/sale compliance officer.

SURFACE MINING AND CONSTRUCTION

Surface mining and construction are very similar, in terms of inspection needs. The time of greatest fire danger in any of these activities is during the pioneering or right-of-way clearing phase. At this time, people and machines are working in, and among vegetative fuels, which may be highly flammable during a major portion of the year.

Explosives

Explosives are used by numerous wildland industrial operations, especially construction and mining. When their use is kept in the hands of experienced personnel, their fire starting potential has proven to be low. However, in the hands of untrained or illegal users their potential for both fire and blast damage is great.

The transportation, storage and use of explosives is regulated by federal, state, and local laws. These laws are primarily aimed at protecting the public from blast damage, theft,

terrorism, illegal possession and use. They are usually administered by law enforcement rather than fire agencies.

Regulations of the Federal Bureau of Alcohol, Tobacco and Firearms (27 CFR § 555.41) provide for explosives licenses and permits, classes of explosive materials, types of storage facilities, location of storage facilities, construction of storage facilities, quantity and storage restrictions, and required distances from exposures. Included among these regulations is one (27 CFR § 555.2l5) which states, "The area surrounding magazines, is to be kept clear of rubbish, brush, dry grass, or trees (except live trees more than 10 feet tall) for not less than 25 feet in all directions." When explosive magazines are present, this is the primary inspection point for prevention personnel.

The other activities and equipment used in these operations are covered adequately under "Machinery and Heavy Equipment" and "Operating Areas".

IV. INSPECTION RESOURCES

INSPECTION RECORDS

Keeping good records of inspections is essential. Using checklists, informal forms, and records such as the ones that follow in this chapter ensures that:

a) the most important risks are inspected;

b) the same things are inspected across the board; and

c) there is documentation of the inspection for future reference and follow-up

The following checklists can be copied, enlarged and printed from this guide, or if a cleaner copy is needed, it is available from the WUI/Prevention Specialists.

Heavy Equipment Inspection Record

Bureau of Indian Affairs – Wildfire Prevention
Heavy Equipment Inspection Record

Date of Inspection _____ Inspected By: _____

Agency/Tribal Jurisdiction: _____ State: _____ County:_____

Qtr.(s) ____; Sec. _____; TWP ____; Rng. ____ Lat. _____ Long._____

Type of operation: ☐ Logging; ☐ Construction; ☐ Surface Mining;

☐ Other: _____

Purpose of Inspection: ☐ Initial; ☐ Follow-up

Equipment Type (Select One): ☐ Bulldozer; : ☐ Road Grader; ☐ Cable (High Lead);
☐ Cable (Skyline); ☐ Skidder; ☐ Harvester (feller buncher, hydro-axe, etc); ☐ Delimber; :
☐ Forwarder; : ☐ Chipper; ☐ Loader; ☐ Farm tractor; ☐ Trencher; ☐ Front End Loader;
☐ Excavator; ☐ Fork Lift
☐ Other: _____

Make: _____ **Model:** _____

Identification number: ☐ VIN _____☐ Serial #_____

☐ Company # _____

Location where inspected: ☐ In use; ☐ In shop; ☐ Parking Area

_____

Maintenance Records: ☐ Up-to-date; ☐ Maintenance Needed; ☐ No records; ☐ Not Applicable

Engine Compartment: ☐ Clean; ☐ Flammable debris present

Fuel System: ☐ OK; ☐ Leaking fuel cap; ☐ Leaking fuel tank;
☐ Leaking fittings; ☐ Leaking/damaged lines; ☐ Substandard line repairs using plastic or rubber tubing; ☐ Excessive oily dust and grime around fittings.

Electrical wiring: ☐ OK; ☐ Heat shields missing; ☐ Not-secured away from moving parts;
☐ Not-secured away from exhaust; ☐ Frayed, abraded or cracked insulation; ☐ Unwrapped splices; ☐ Loose connections

Exhaust System: ☐ OK; ☐ Leaks observed; ☐ Missing spark arrestor (if required);
☐ Spark arrestor needs cleaning; ☐ Flammable debris build up near manifold.

Undercarriage/ belly pan: ☐ Clean; ☐ Flammable debris present

(FRONT)

Operator Compartment: ☐ Clean; ☐ Excessive flammable debris present

Fire Extinguisher: ☐ Present, Charged; ☐ Needs charging; ☐ Too small; ☐ Wrong Type; ☐ Missing;

Other Mechanical Issues:

Mandatory repairs and maintenance:

Due dates and follow-up inspections

(BACK)

Power Line Inspection Record

Bureau of Indian Affairs – Wildfire Prevention
Power Line Inspection Record

Date of Inspection _____ Inspected By: _____

Purpose of Inspection: ☐ Initial; ☐ Annual; ☐ Storm Follow-up.

Line Type(s): ☐ Transmission; ☐ Distribution; ☐ Residential

Location/Description of Line:

Agency/Tribal Jurisdiction: _____

State: _____ County:_____

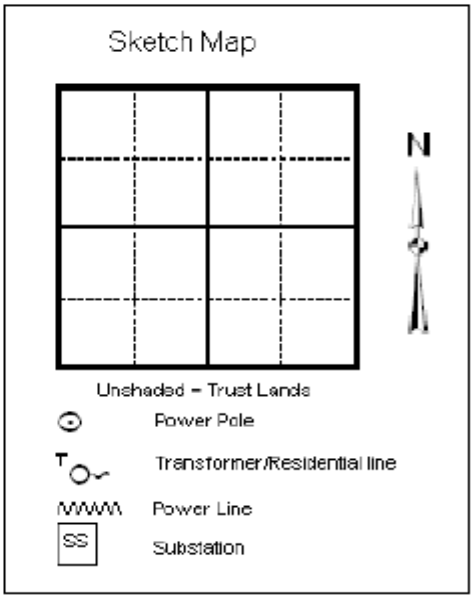
Qtr.(s) ____; Sec. _____; TWP ____; Rng. ____

Length of Line on Trust: _____

Number of: _____ Poles on Trust
_____ Line Splices
_____ Transformers on Trust

_____ Wires (1, 2, 3, 5, other)

Height of lowest line: _____ ft.



Map represents : ☐ Qtr.;☐ Sec;
☐ 4 sq. mi.; ☐ 16 sq. mi.

Fuels within 30 ft. of Line (Check All that Apply): ☐ Wheat/Small Grains; ☐ Tall Grasses/Weeds; ☐ Heavily Grazed Pasture/Lawn; ☐ Bare Soil (not cropland); ☐ brush/timber; ☐ Other_____

Potential Hazards:

1. ☐ Limb Encroachment; ☐ Vines; ☐ Pole Damaged; ☐ Insulators Damaged; ☐ Nests; ☐ Excessive Line Sag; ☐ Missing/ broken pole ground wires; ☐ Un-insulated Meter clamps
   Lat._____ Long _____ : Pole # _____; Photo # _____

2. ☐ Limb Encroachment; ☐ Vines; ☐ Pole Damaged; ☐ Insulators Damaged; ☐ Nests; ☐ Excessive Line Sag; ☐ Missing/ broken pole ground wires; ☐ Un-insulated Meter clamps
   Lat._____ Long _____ : Pole # _____; Photo # _____

3. ☐ Limb Encroachment; ☐ Vines; ☐ Pole Damaged; ☐ Insulators Damaged; ☐ Nests; ☐ Excessive Line Sag; ☐ Missing/ broken pole ground wires; ☐ Un-insulated Meter clamps
   Lat._____ Long _____ : Pole # _____; Photo # _____

(FRONT)

Bureau of Indian Affairs – Wildfire Prevention
Power Line Inspection Record

Potential Hazards – Continued

4. ☐ Limb Encroachment; ☐ Vines; ☐ Pole Damaged; ☐ Insulators Damaged; ☐ Nests; ☐ Excessive Line Sag; ☐ Missing/ broken pole ground wires; ☐ Un-insulated Meter clamps
Lat._____ Long _____ : Pole # _____; Photo # _____

5. ☐ Limb Encroachment; ☐ Vines; ☐ Pole Damaged; ☐ Insulators Damaged; ☐ Nests; ☐ Excessive Line Sag; ☐ Missing/ broken pole ground wires; ☐ Un-insulated Meter clamps
Lat._____ Long _____ : Pole # _____; Photo # _____

6. ☐ Limb Encroachment; ☐ Vines; ☐ Pole Damaged; ☐ Insulators Damaged; ☐ Nests; ☐ Excessive Line Sag; ☐ Missing/ broken pole ground wires; ☐ Un-insulated Meter clamps
Lat._____ Long _____ : Pole # _____; Photo # _____

7. ☐ Limb Encroachment; ☐ Vines; ☐ Pole Damaged; ☐ Insulators Damaged; ☐ Nests; ☐ Excessive Line Sag; ☐ Missing/ broken pole ground wires; ☐ Un-insulated Meter clamps
Lat._____ Long _____ : Pole # _____; Photo # _____

8. ☐ Limb Encroachment; ☐ Vines; ☐ Pole Damaged; ☐ Insulators Damaged; ☐ Nests; ☐ Excessive Line Sag; ☐ Missing/ broken pole ground wires; ☐ Un-insulated Meter clamps
Lat._____ Long _____ : Pole # _____; Photo # _____

9. ☐ Limb Encroachment; ☐ Vines; ☐ Pole Damaged; ☐ Insulators Damaged; ☐ Nests; ☐ Excessive Line Sag; ☐ Missing/ broken pole ground wires; ☐ Un-insulated Meter clamps
Lat._____ Long _____ : Pole # _____; Photo # _____

Power Service Provider Contacted: ☐ No; ☐ Yes, Date _____

Name of Power Company: _____; Phone: _____

Instructions:

1. Remember **SAFETY FIRST** – Assume all power lines are charged, ALWAYS.
2. Depict the lines and trust lands on the sketch map.
3. Record the Qtr,, Section, Township and Range for the segment.
4. Show the approximate position of each pole; identify transformers, junctions, residential lines and taps on the map using the appropriate symbols.
5. Record the Pole Number (usually on a tag on the pole) for hazard poles.
6. Photograph the entire segment of line and poles shown on the sketch map. Take as many photos as needed to capture the scene, use a photo log to describe the direction and subject of the photo.
7. Photograph each pole, showing the lines, cross arms, fuels underneath and hazards. Document in the photo log the pole number for each photo.
8. Identify any hazards on the form and place the number of the hazard at the approximate location on the sketch map.
9. Attach the photo log and all photos to the inspection form and file in a logical manner.
10. Notify the power company of any potential hazards.

(BACK)

Operating Area Inspection Record

Bureau of Indian Affairs – Wildfire Prevention
Operating Area Inspection Record

Date of Inspection _____ Inspected By: _____

Agency/Tribal Jurisdiction: _____ State: _____ County:_____

Qtr.(s) ____; Sec. _____; TWP ____; Rng. ____ Lat. _____ Long._____

Type of operation: ☐ Timber Harvesting; ☐ Construction; ☐ Surface Mining; ☐ Oil & Gas

☐ Other: _____

Purpose of Inspection: ☐ Initial; ☐ Follow-up

Inspection Points (Select All that Apply):

___ **Hazardous fuel accumulations on site.** (Describe type and location):

___ **Smoking Areas** - ☐ OK; ☐ Vegetation control needed; ☐ Signage needed; ☐ Suppression equipment/extinguisher needed; ☐ Butt cans needed; (describe):

___ **Warming / Debris disposal fires** - ☐ OK; ☐ Inadequate vegetation clearance; ☐ Suppression equipment/extinguisher needed; (describe):

___ **Equipment fabrication/repair area** (welding, cutting and grinding) - ☐ OK; ☐ Vegetation control needed; ☐ Signage needed; ☐ Suppression equipment/extinguisher needed; (describe):

___ **Equipment refueling area** - ☐ OK; ☐ Vegetation control needed; ☐ Signage needed; ☐ Suppression equipment/extinguisher needed; (describe):

___ **Access roads/Parking areas** - ☐ OK; ☐ Vegetation control needed; ☐ Signage needed; ☐ Maintenance needed; (describe):

___ **Other:** _____; (describe):

Mandatory repairs and maintenance: ☐ None

1.

2.

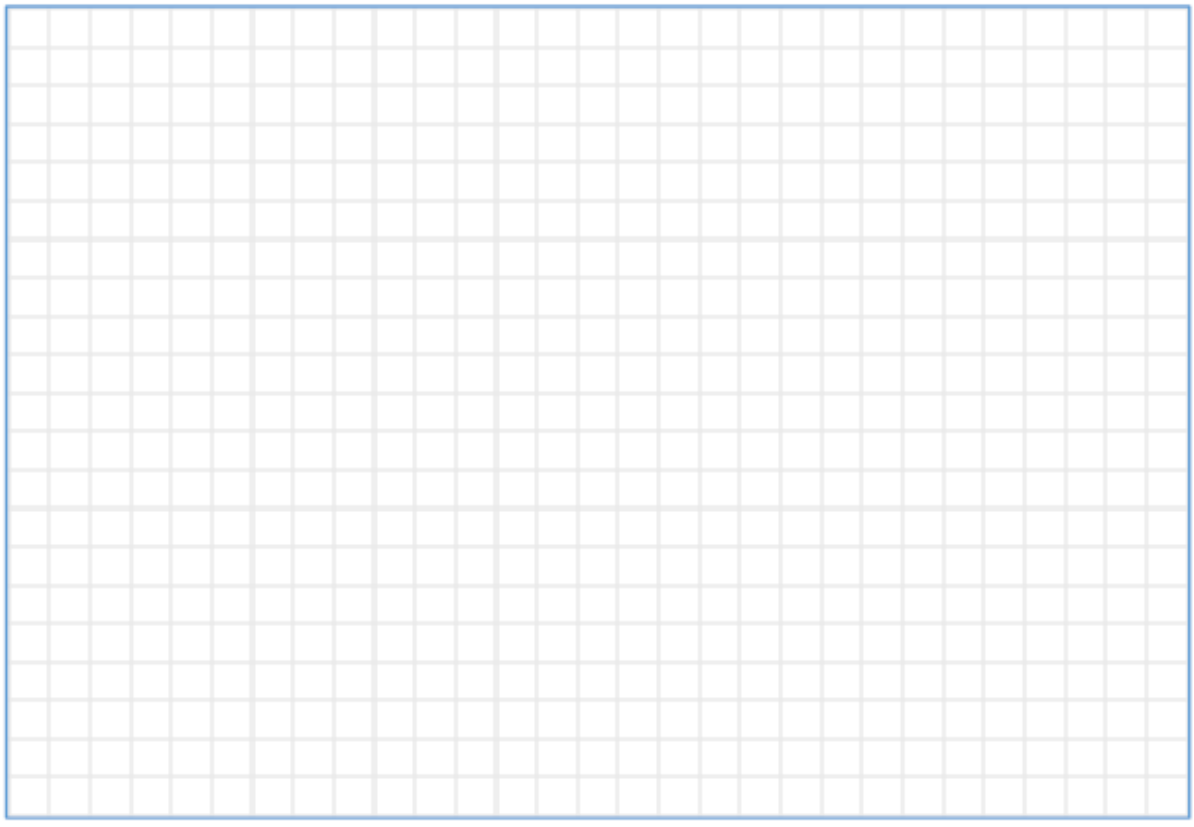
3.

4.

5.

Due dates and follow-up inspections

Sketch Map



Campground Inspection Record

Bureau of Indian Affairs
Wildfire Prevention Campground Inspection Record

Campground Name _____

Date of Inspection _____ Inspected By: _____

Agency/Tribal Jurisdiction: _____ State: _____ County:_____

Qtr(s). ____; Sec. _____; TWP ____; RNG. ____

Purpose of Inspection: ☐ Initial; ☐ Annual; ☐ Storm Follow-up.

Campground Type(s): ☐ Cabins; ☐ RV Slips; ☐ Tents; ☐ Day Use;
☐ Other_____

Site is: ☐ Staffed 24/7; ☐ Staffed seasonally; ☐ Staffed daylight hours;
☐ Unstaffed and patrolled; ☐ Unstaffed and not patrolled

Gates: ☐ No; ☐ Yes; _____ (#); ☐ Locked ; _____ (#)

Access Road Conditions:
Surface:
☐ Gravel; ☐ Crushed Rock; ☐ Dirt
☐ Paved ☐ Other _____

Vegetation Control:

Access Road Shoulders-	☐ Maintained; ☐ Needs Maintenance; ☐ Hazardous fuels
Parking Areas -	☐ Maintained; ☐ Needs Maintenance; ☐ Hazardous fuels
RV Slips/Campsites -	☐ Maintained; ☐ Needs Maintenance; ☐ Hazardous fuels
Raised Cooking Grates -	☐ Maintained; ☐ Needs Maintenance; ☐ Hazardous fuels
Campfire Rings -	☐ Maintained; ☐ Needs Maintenance; ☐ Hazardous fuels
Recreation/Sports Areas -	☐ Maintained; ☐ Needs Maintenance; ☐ Hazardous fuels

Electrical Power

Are outlets, fuse boxes, circuit breakers and switches rated for outdoors use by UL? ☐ Yes; ☐ No

Are electric lines above ground? ☐ Yes; ☐ No

Signage

Is there a fire danger sign in the campground?
☐ Yes; ☐ No

Are appropriate fire safety signs posted for:
Ash disposal? ☐ Yes; ☐ No
Campfire safety? ☐ Yes; ☐ No
Fireworks restrictions? ☐ Yes; ☐ No
Parking restrictions? ☐ Yes; ☐ No

(FRONT)

Special Considerations: ☐ Fireworks use; ☐ Party Site; ☐ Heavy use area; ☐ WUI Nearby; ☐ Off Road Vehicle Use; ☐ Other_____

Publications:

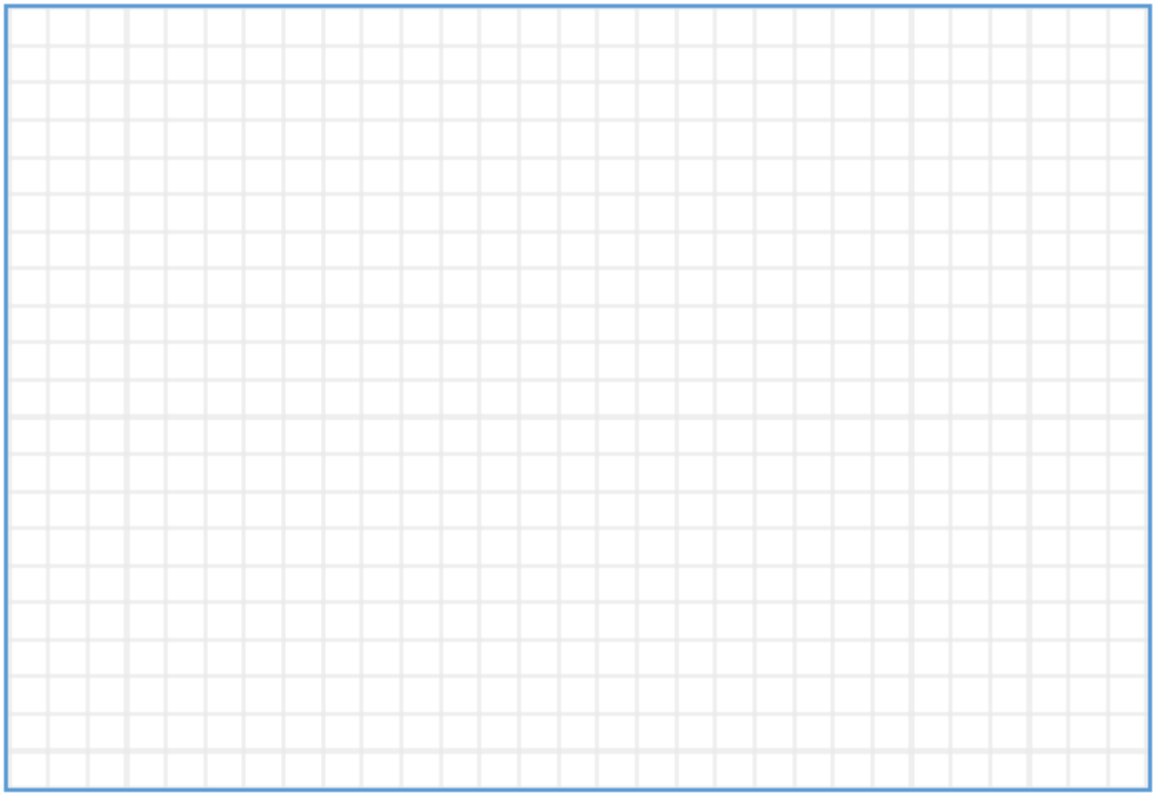
Is the "Outdoor Fire Safety" brochure available? ☐ Yes; ☐ No

Is fire safety discussed in park or campground rules brochures? ☐ Yes; ☐ No; ☐ N/A

Mandatory items to be addressed:

Due Date for corrections/re-inspection: _____

Sketch Map



(BACK)

Recreation Site Potential Ignition Risks

- ☐ **Camping**
  - ☐ Primitive campgrounds
  - ☐ Campfires, cooking and warming fires
  - ☐ Fuel storage
  - ☐ Lanterns and luminaries
  - ☐ Gas stoves and heaters
  - ☐ Gas/charcoal grills
  - ☐ Raised cooking grills
  - ☐ Bonfires
  - ☐ Tiki torches
  - ☐ RV electrical connections
  - ☐ Cabins/pavilions with fireplaces
  - ☐ Chimneys
  - ☐ Ash disposal
  - ☐ Smoking
- ☐ **Recreation Activities**
  - ☐ Children with matches
  - ☐ Firearms use
  - ☐ Fireworks use
  - ☐ Party areas
  - ☐ Dragging chains
  - ☐ Off-road vehicle use
- ☐ **Site Maintenance**
  - ☐ Mowing, site maintenance
  - ☐ Construction projects
  - ☐ Power lines/substations
  - ☐ Welding/cutting/grinding
  - ☐ Chainsaw use
  - ☐ Power equipment use
- ☐ **Transportation**
  - ☐ Unpaved parking areas
  - ☐ Unpaved roads
  - ☐ Transportation corridors
  - ☐ Vehicle fire
  - ☐ Exhaust/catalytic converter
- ☐ **General Surroundings**
  - ☐ Forest/range management activities on adjacent lands
  - ☐ Communication sites
  - ☐ Cultural activities
  - ☐ Wildland urban interface
  - ☐ Wildland urban intermix
  - ☐ Drug labs/cultivation
  - ☐ Dump/trash/debris burning

Oil Field Site Inspection Record

Bureau of Indian Affairs
Wildfire Prevention Oil Field Site Inspection Record

Site # _____

Date of Inspection _____ Inspected By: _____

Purpose of Inspection: ☐ Initial; ☐ Annual; ☐ Storm Follow-up.

Equipment Type(s): ☐ Pump Jack; ☐ Storage Tanks; ☐ Pumping Station;
☐ Other_____

Site is: ☐ Active; ☐ Dormant; ☐ Abandoned

Location/Description of Site:

Agency/Tribal Jurisdiction: _____

State: _____ County:_____

Qtr(s). ____; Sec. _____; TWP ____; RNG. ____

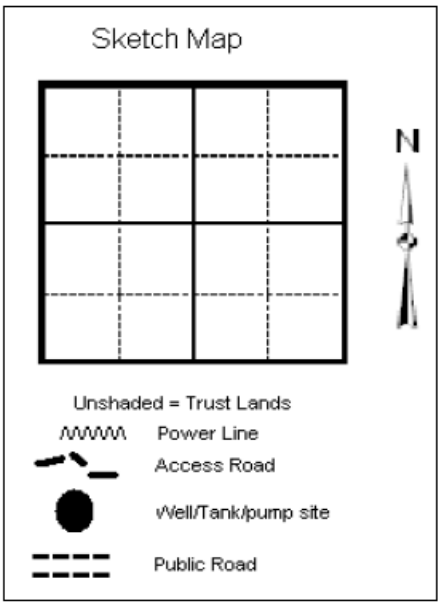
Power: ☐ Electric
☐ Internal Combustion Engine
☐ N/A

Lat. _____ Long. _____
(in Decimal Degrees)

Gates:
☐ No; ☐ Yes; _____ (#); ☐ Locked

Access Road Conditions:
Surface:
☐ Gravel; ☐ Crushed Rock; ☐ Dirt
☐ Paved

Sketch Map



Map represents : ☐ Qtr; ☐ Sec;
☐ Other _____

Vegetation Control:

Overgrown - ☐ Access Road; ☐ Site; ☐ Parking Apron/Turnaround
Maintained - ☐ Access Road; ☐ Site; ☐ Parking Apron/Turnaround
Needs Maintenance - ☐ Access Road; ☐ Site; ☐ Parking Apron/Turnaround
(grass and weeds growing in center)

Fuels within 30 ft. of Site (Check All that Apply): ☐ Wheat/Small Grains; ☐ Tall Grasses/Weeds; ☐ Heavily Grazed Pasture/Lawn; ☐ Bare Soil (not cropland); ☐ brush/timber; ☐ Other_____

Potential Hazards Summary: (show location by number on sketch map)

1. ☐ Vegetation Management on Access Road;
2. ☐ Vegetation Management at site;
3. ☐ Unprotected electric lines on surface;
4. ☐ Electric lines sagging near fuels.
5. ☐ Internal combustion engine runs poorly;
6. ☐ Party Site (beer cans, etc.);
7. ☐ Weeds/Tall Grasses growing within 10 ft. of electric motor or engine;
8. ☐ Exhaust/Flare Stack within 10 ft. of veg. fuel.

Bureau of Indian Affairs –
Wildfire Prevention Oil Field Site Inspection Record

BIA Realty/Minerals/Lease Compliance Contacted? ☐ No; ☐Yes, Date_____

Name of contact: _____

Well Service Provider/Site Operator Contacted? ☐ No; ☐ Yes, Date _____

Name of Company: _____; Phone: _____

Name of Contact: _____

Electric Power Service Provider Contacted: ☐ No; ☐ Yes, Date _____

Name of Power Company: _____; Phone: _____

Instructions:

1. Remember- **Safety First** – Always observe and follow any placards or signs at the site. Approach from upwind if possible. It is not necessary to actually go up on the well pad in most cases.
2. Depict the site, access roads, county roads and trust lands on the sketch map.
3. Record the Qtr., Section, Township and Range for the site
4. Show the approximate position of any power poles.
5. Photograph the entrance (include Corporation Comm. Placard and gates), access roads and site. Take as many photos as needed to capture the scene, use a photo log to describe the direction and subject of each photo.
6. Identify any hazards on the form and place the number of the hazard at the approximate location on the sketch map.
7. Attach the photo log and all photos to the inspection form and file in a logical manner.
8. Notify the power company/Site operator and BIA Realty/Lease Compliance of any potential hazards.

(BACK)

Railroad Track Inspection Record

Bureau of Indian Affairs – Wildfire Prevention
Railroad Track Inspection Record

Date of Inspection _____ Inspected By: _____

Purpose of Inspection: ☐ Initial; ☐ Annual; ☐ Storm Follow-up.

Track Type(s): ☐ Single track; ☐ Multiple Tracks; ☐ Siding;
☐ Other_____

Location/Description of Site:

Agency/Tribal Jurisdiction: _____

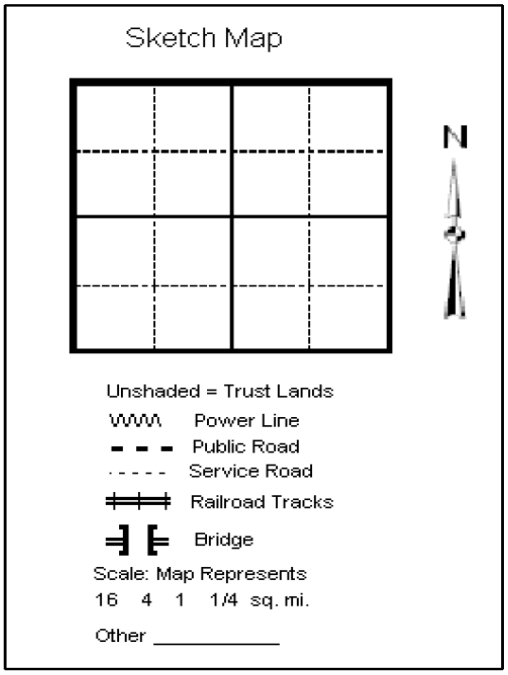
State: _____ County:_____

Qtr.(s) ____; Sec. _____; TWP ____; Rng. ____

Lat. _____ Long. _____
(in Decimal Degrees At North or West end)

Service Road Conditions:
Surface:
☐ Gravel; ☐ Crushed Rock; ☐ Dirt

Right of Way –
Track Apron - ☐ Maintained; ☐ Overgrown;
☐ Abandoned



Vegetation Control:

Generally describe this segment

Service Road - ☐ Maintained; ☐ Overgrown; ☐ Abandoned
Tracks - ☐ Maintained; ☐ Overgrown; ☐ Abandoned
ROW - ☐ Maintained; ☐ Overgrown; ☐ Abandoned
Switches - ☐ Maintained; ☐ Overgrown; ☐ Abandoned
Crossing Signals- ☐ Maintained; ☐ Overgrown; ☐ Abandoned
Other -_____ ☐ Maintained; ☐ Overgrown; ☐ Abandoned

Fuels within 30 ft. of Tracks (Check All that Apply): ☐ Wheat/Small Grains; ☐ Tall Grasses/Weeds; ☐ Heavily Grazed Pasture/Lawn; ☐ Bare Soil (not cropland); ☐ brush/timber; ☐ Other_____

Potential Hazards Summary: (Show location by number on sketch)

1. ☐ Vegetation Management on Service Road
2. ☐ Vegetation Management between Tracks
3. ☐ Vegetation Management on ROW
4. ☐ Party Site (beer cans, etc.)

(FRONT)

Bureau of Indian Affairs – Wildfire Prevention
Railroad Track Inspection Record

Realty/Lease Compliance Contacted? ☐☐ No; ☐ Yes, Date _____

Name of contact: _____

Rail Road Contacted?: ☐ No; ☐Yes, Date _____

Name of Company: _____; Phone: _____

Name of Contact: _____

Instructions:

1. Remember **SAFTEY FIRST -** Observe and follow any placards or signs at the site. Watch for Trains.
2. Depict the tracks, service roads, county roads and trust lands on the sketch map.
3. Record the Qtr., Section, Township and Range for the site
4. Show the approximate position of any bridges
5. Photograph the segment, access roads and any specific hazards. Take as many photos as needed to capture the scene, use a photo log to describe the direction and subject of each photo.
6. Identify any hazards on the form and place the number of the hazard at the approximate location on the sketch map.
7. Attach the photo log and all photos to the inspection form and file in a logical manner.
8. Notify the Railroad and Realty/Lease Compliance of any potential hazards.

(BACK)

Target Range Inspection Record

Bureau of Indian Affairs – Wildfire Prevention
Target Range Inspection Record

Date of Inspection _____ Inspected By: _____

Range Name: _____

Agency/Tribal Jurisdiction: _____ State: _____ County:_____

Qtr.(s) ____; Sec. _____; TWP ____; Rng. ____ Lat. _____ Long._____

The range is: ☐ Staffed; ☐ Unstaffed
☐ Public; ☐ Private
Purpose of Inspection: ☐ Initial; ☐ Follow-up

Ranges: ☐ Pistol; ☐ Rifle; ☐ Primitive arms; ☐ Exploding target; ☐ Shotgun; ☐ Silhouette (Cowboy); ☐ Multi-purpose

Access: ☐ Open; ☐ Locked gates

Inspection Points (Select All that Apply):

___ **Firing line/stations** - ☐ OK; ☐ Downrange vegetation control needed; ☐ Signage needed; ☐ Suppression equipment/extinguisher needed; (describe):

___ **Hazardous fuel accumulations on site**. (Describe type and location):

___ **Smoking Areas** (if allowed) - ☐ OK; ☐ Vegetation control needed; ☐ Signage needed; ☐ Suppression equipment/extinguisher needed; ☐ Butt cans needed; (describe):

___ **Exploding Target Area** (if allowed) - ☐ OK; ☐ Inadequate vegetation clearance; ☐ Suppression equipment/extinguisher needed; (describe):

___ **Access roads/Parking areas** - ☐ Vegetation control needed; ☐ Maintenance needed; (describe):

___ **Other:** _____; (describe):

Mandatory repairs and maintenance: ☐ None

1.

2.

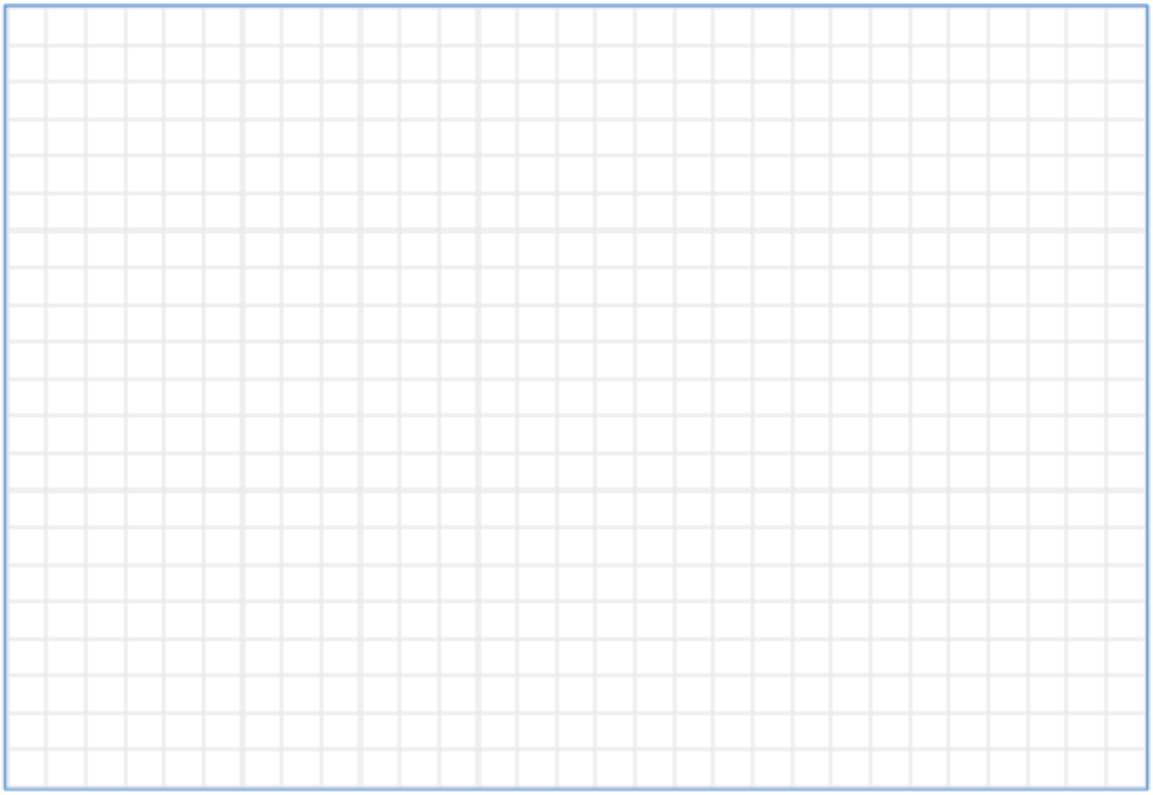
3.

4.

5.

Due dates and follow-up inspections

Sketch Map



Dump Inspection Record

Bureau of Indian Affairs – Wildfire Prevention
Dump Inspection Record

Date of Inspection _____ Inspected By: _____

Purpose of Inspection:

☐ Initial; ☐ Follow-up;

Dump Type: ☐ Municipal/Commercial; ☐ Illegal Dump Site (Posing a threat)

Location of Dump Site:

Agency/Tribal Jurisdiction: _____ State: _____ County:_____

Qtr.(s) ____; Sec. _____; TWP ____; Rng. ____ Lat. _____ Long._____

Description/Characteristics of Dump Site:

☐ Above Ground ☐ Below Ground Diameter of pile/pit: ☐<15';☐25';☐< 50';☐>50';
Elevation: _____ Slope:_____ Aspect:_____

Adjacent Fuels (Check All that Apply): ☐ Wheat/Small Grains; ☐ Tall Grasses/Weeds; ☐ Heavily Grazed Pasture/Lawn; ☐ Bare Soil (not cropland); ☐ brush/timber; ☐ Other_____

Potential Hazards:

- ☐ No defensible space around perimeter;
- ☐ Unknown materials (explosive potential);
- ☐ No fire breaks in place;
- ☐ Ladder fuels not removed/reduced adjacent to site;
- ☐ Unattended fire at site;
- ☐ Management burns woody material as part of operations;
- ☐ History of wildfires;
- ☐ Remote location, fire suppression exceeding 15 minutes;
- ☐ Heavy equipment operations;
- ☐ Minimal Risk of Ignition or Fire Spread;

Instructions:

1. Remember **SAFETY FIRST** – Assume the dump site is a hazardous materials site and proceed with caution.
2. Depict the dump and trust lands on the sketch map.
3. Take as many photos as needed to capture the scene, use a photo log to describe the direction and subject of the photo.
4. Photograph each dump pit/pile, showing adjacent fuels and hazards. Document in the photo log each photo.
5. Identify any hazards on the form and their approximate location on the sketch map.
6. Attach the photo log and all photos to the inspection form and file in a logical manner.
7. Notify the landowner/tribe of any potential hazards to coordinate mitigation efforts.

Comments/Suggestions:_____
_____

Mandatory Issues to address

Recommended Issues

Notifications:

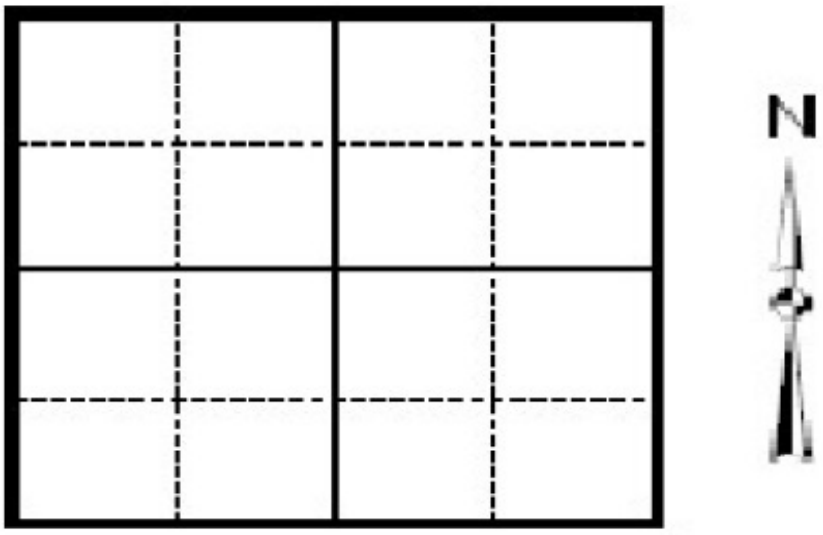
If this was an illegal dump, which of the following were notified?

☐ Landowner; ☐ Tribal/BIA Land Operations Officer; ☐ Law Enforcement.

If this was a legally operated dump, who at the management office was notified of the results of the inspection?

Name	Title	Date

Sketch Map



REFERENCES

The US Forest Service Spark Arrester Guides can be found online at: https://www.fs.fed.us/t-d/programs/fire/spark_arrester_guides/.

The *California Power Line Fire Prevention Field Guide* can be found online at: http://cdfdata.fire.ca.gov/fire_er/fpp_engineering_view?guide_id=15.

The NWCG publication *NWCG Standards for Wildfire Prevention: Recreation Areas and Patrols* can be found online at: https://www.nwcg.gov/sites/default/files/publications/pms456.pdf.

The National Fire Protection Association (NFPA) provides standards for Recreational Vehicle Parks and Campgrounds (NFPA 1194) at: https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1194.

The OSHA Oil and Gas Well Safety eTool can be found online at: https://www.osha.gov/SLTC/etools/oilandgas/general_safety/general_safety.html.

The NWCG course: Investigating Railroad Caused Fires can be found online at: https://onlinetraining.nwcg.gov/node/216.

CALFire's Guide on *Railroad Fire Prevention* can be found online at: http://cdfdata.fire.ca.gov/pub/fireplan/fpupload/fppguidepdf100.pdf.

The National Rifle Association's (NRA) 2012 NRA Range Source Book is available for purchase at: https://materials.nrahq.org/2012-nra-range-source-book.html.

The US Department of Energy publication, *Range Design Criteria,* is available online at: https://www.energy.gov/sites/prod/files/2013/05/f1/Range_Design_Criteria.pdf.

CALFire's Target Shooting Safety Tips is available online at: http://www.readyforwildfire.org/Target-Shooting-Safety/.

Waste 360's Prevention is Key in Managing Landfill Fires can be found online at: https://www.waste360.com/nuisances/prevention-key-managing-landfill-fires.

OSHA provides a general educational Logging eTool, on timber harvesting, available online at: https://www.osha.gov/SLTC/etools/logging/userguide.html.

The US Forest Service provides a guide to Cable Logging Operations available online at: https://www.fs.fed.us/forestmanagement/equipment-catalog/cable.shtml.

The NFPA provides standards for Fire Prevention and Control in Metal/Nonmetal Mining and Metal Mineral Processing Facilities (NFPA 122) available at: https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=122.

The NFPA provides standards for Fire Protection for Self-Propelled and Mobile Surface Mining Equipment (NFPA 121) available for purchase at: https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=121.

Oil Field Gas Safety

Well Pad Gas Safety
H2S

Southern Ute Indian Tribe

Concentration / Effects

Concentration (ppm)	Effect
< 1	Odor Threshold
10	Obvious and unpleasant odor. Eye Irritation. OSHA Permissible Exposure Limit (PEL)
20	OSHA Ceiling Value
100	Immediately Dangerous to Life or Health (IDLH) Loss of sense of smell in 3 to 15 minutes. Altered breathing, coughing, drowsiness. Possible death within 48 hours.
500	Dizziness; stops breathing in minutes; Loss of muscle control
1000	Immediate unconsciousness; death within minutes

Southern Ute Indian Tribe

Hydrogen Sulfide Properties & Hazards

- Colorless
- Toxic
  - Potentially deadly at concentrations above 100 ppm.
- Flammable*
  - Concentration must be at least 4.3% in air (43,000 ppm)
- Odor – "rotten egg"
  - Paralyzes sense of smell
- Heavier than air (~ 21% heavier)

Southern Ute Indian Tribe

Recognition of Symptoms

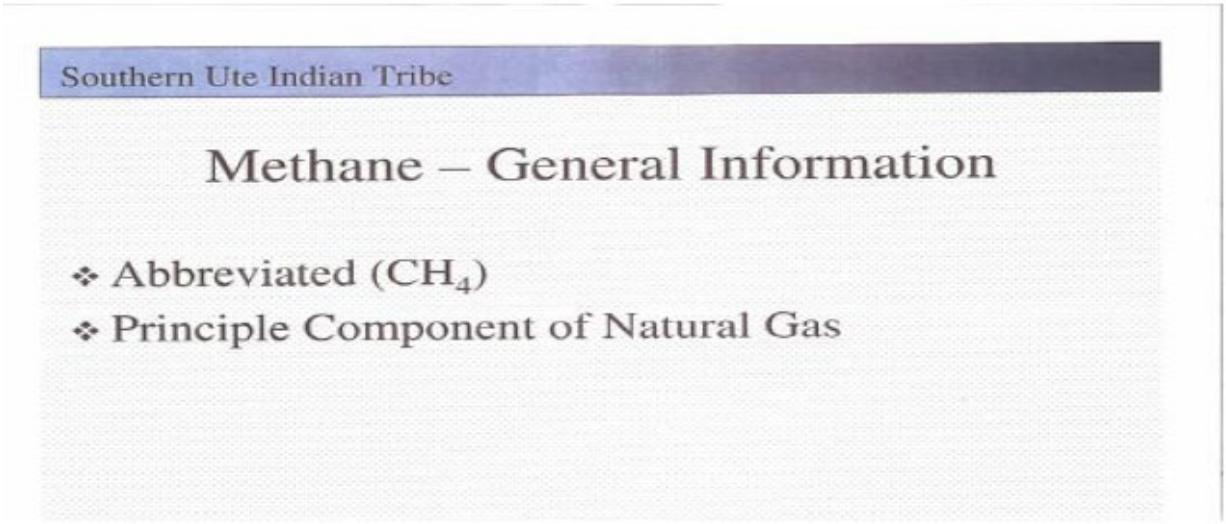
- Symptoms of H_2S Exposure include:
  - Eye Irritation
  - Dryness / irritation of throat
  - Irritation of respiratory system
  - Loss of smell
  - Headache
  - Nausea
  - Vomiting

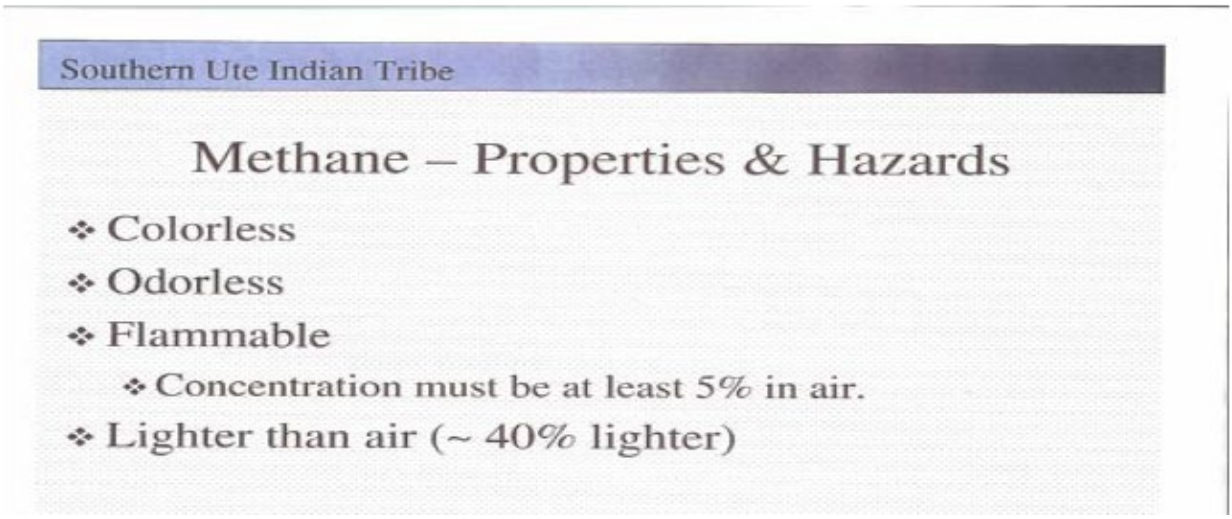
Southern Ute Indian Tribe

Response to Detected / Suspected H_2S

- Leave Area Immediately – Go Upwind
- Seek Medical Help if needed

METHANE (CH4)


Southern Ute Indian Tribe
Methane – General Information
Abbreviated (CH_4)
Principle Component of Natural Gas


Southern Ute Indian Tribe
Methane – Properties & Hazards
Colorless
Odorless
Flammable
Concentration must be at least 5% in air.
Lighter than air (~ 40% lighter)

CARBON MONOXIDE (CO)