Preventative Maintenance Program
# Table of Contents

117.0  Preventative Maintenance Program ................................................................. 4  
118.0  Mission Statement .............................................................................................. 5  
119.0  Overall Objectives ............................................................................................. 5  
120.0  Manufactures Recommended Maintenance ...................................................... 6  
121.0  Components of the Preventative Maintenance Program ...................................... 7  
   122.0  Inventory ........................................................................................................... 7  
   123.0  Preventative Maintenance (PM) Manual .......................................................... 7  
   124.0  Service Schedules ........................................................................................... 7  
   125.0  Oil Analysis ..................................................................................................... 7  
   126.0  Motor Books ................................................................................................... 7  
   127.0  Training ........................................................................................................... 7  
   128.0  Preventative Maintenance Audits ................................................................... 8  
   129.0  Hoisting Equipment Log .................................................................................. 8  
   130.0  Certifications .................................................................................................. 9  
   131.0  Inspections ..................................................................................................... 9  
   132.0  Drill Collar Inspection Discrepancy Reports .................................................... 10  
   133.0  Code of Colors ............................................................................................. 11  
   134.0  Shut Down List ............................................................................................... 11  
   135.0  Purchasing Controls ....................................................................................... 12  
   136.0  Vehicle Maintenance and Inspection ............................................................... 12
117.0 Preventative Maintenance Program

Preventive maintenance is a schedule of planned maintenance actions aimed at the prevention of breakdowns and failures. The primary goal of preventive maintenance is to prevent the failure of equipment before it actually occurs.

Preventive maintenance activities include:

- An inventory or equipment and machinery requiring routine maintenance,
- An inspection schedule suitable for each type of equipment or machinery,
- Records will be maintained for all preventative maintenance activities including equipment checks,
- Partial or complete overhauls at specified periods,
- Oil changes or lubrication as examples.

In addition, workers should record equipment deterioration so they know to replace or repair worn parts before they cause system failure.

Pre-maintenance programs are designed to preserve and enhance equipment reliability by replacing worn components before they actually fail. Preventative maintenance is a formal inspection that will prevent incidents and the release or loss of energy that may lead to injuries of the worker.

Chinook Drilling is committed to provide all mechanical and physical facilities in a condition in keeping with the highest possible standard for provision of a “Safe” work environment. A program of preventative maintenance has been established to ensure that the equipment provided for operations shall be maintained at, or above, industry standards. As the worksites are often remote and working conditions difficult, each person is obligated to perform the necessary routines to ensure that all equipment has the highest possible degree of reliability. In order to accomplish this, the objective of the Preventative Maintenance Program (PMP) will be to eliminate catastrophic failure of equipment. The realization of this objective will require that the maintenance records, checks and inspections be completed in the manner described by the PMP and at the intervals stated. Records shall be kept for the service life of each of the major components to ensure compliance.

The Chinook Drilling, Maintenance Program (PMP) is designed to eliminate the risk to the company’s assets including its most important asset, its employees.

Specifically, the PMP consists of three parts:
1. Inventory
   • A complete and accurate inventory of all capital equipment associated with the drilling rig should be kept and updated periodically.

   • For each group of capital components (e.g. Power Components - Engines and Transmissions), a manual which includes equipment specifications, part numbers, drawings, service procedures and lubrication standards shall be available both at the rig and at the Operations Center.

3. Service Schedules
   • For each group of capital components (e.g. Power Components - Engines and Transmissions), a complete set of service schedules shall be prepared for posting at each component’s location or in a service routing manual. This schedule shall outline the service routines and timing of each. (e.g. hourly, weekly, monthly, service hours.)

Integral to this program will be consistent use of oil analysis, record keeping, training and auditing. Certifications shall be completed as required by regulations or as established by the Company.

118.0 Mission Statement
To build and develop an interactive, planned Preventative Maintenance Program (PMP) to efficiently manage the company’s capital assets in a manner designed to meet or exceed industry and corporate objectives for equipment serviceability and safe operations.

119.0 Overall Objectives
The overall objective of the program is to eliminate catastrophic failure of equipment and the attentive risk to personnel. Specifically, the program is designed to:
   • Reduce maintenance cost.
   • Reduce rig down time.
   • Optimize equipment overhaul intervals.
   • Evaluate cost/benefit of capital modifications.
   • Provide customers and Management with
     • up-to-date certification dates
     • up-to-date inventories
     • service schedules (Company certification schedules)
• Provide Management with
  • audits of preventative maintenance
  • Information for spring major maintenance expenditure scheduling.
  • information for budget preparation

Reports:
• operating hours on equipment
• service schedules
• required major maintenance
• required capital expenditure
• Provide field personnel with
• maintenance instructions
• maintenance reports
• maintenance intervals
• a method of tracking operating hours
• a method of tracking maintenance at the rig

120.0 Manufactures Recommended Maintenance

It is the intent of Chinook Drilling to ensure that the entire manufacturer’s recommended maintenance schedules are followed for all equipment to be used.

Manufacturer’s maintenance practices must be made available and communicated by management to workers responsible for the use of such equipment.

Reference: Alberta / British Columbia / Canada – Best Practices
121.0 Components of the Preventative Maintenance Program

122.0 Inventory

The Rig Manager shall complete and keep updated an inventory of capital equipment in the form provided.

123.0 Preventative Maintenance (PM) Manual

A PM Manual has been developed for power components and is to be used on all Chinook Drilling, rigs. It contains instruction on service intervals, service required and procedures, equipment information, etc.

124.0 Service Schedules

Service schedules have been developed for engines and transmissions. The service schedules are to be posted at each motor location with outlines of service required at different intervals.

125.0 Oil Analysis

Oil analysis will be used as seen necessary.

126.0 Motor Books

Company developed motor books are to be used on all rigs. The motor book is used to keep track of operating hours, maintenance at the rig and to spot trends in operating parameters.

127.0 Training

A maintenance review is to be arranged as required to maintain all field management, rig managers and drillers with the maximum level of PM Training. The purpose is to learn about power equipment maintenance.

A normal one day maintenance review is also conducted at spring breakup with rig managers, drillers, operations management and mechanics. The purpose is to review problems, cost, policy, communication, new information, etc. This day is also an excellent time to communicate new policies and procedures.

When maintenance audits are conducted on the rig location the auditor must (as much as possible) spend time with drillers, rig managers, and motormen teaching them as required. His rig checks, therefore, usually require one day per rig.
128.0 Preventative Maintenance Audits

Comprehensive power equipment rig checks should be conducted at least once per year on each rig. In addition, Field management, and the Safety Coordinator conduct regular rig checks on some of the items pertaining directly to maintenance.

129.0 Hoisting Equipment Log

To retain a record of inspection, maintenance, modification and repairs of hoisting equipment, a log book must be kept up to date and available at the rig site to record the following information:

- Record of Ownership
- Rated Capacity (safe work load, hoisting capacity)
- Record of Certification
- Record of Inspections
- periodic visual inspection
- major inspections
- Record of maintenance and repairs
- welding - welders certificate number
- replacement of parts
- Record of Accidents - damages and repairs
- hitting the crown
- dropping the derrick
- major cracks to components
- any modifications
- Size and type of rope in used
- Any matter of incident that may affect the safe operation

Hoisting Equipment Includes:
- Derrick (all parts)
- Crown
- Drawworks
- Hook
130.0  Certifications

Chinook Drilling is committed to establishing and maintaining certifications of equipment by regulations or by industry practice.

Currently these include:

<table>
<thead>
<tr>
<th>COMPONENT</th>
<th>SCHEDULE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blow Out Preventers</td>
<td>Each 3 calendar years of service</td>
</tr>
<tr>
<td>Derrick</td>
<td>Each 1000 operating days</td>
</tr>
<tr>
<td>Crown</td>
<td>Each 1000 operating days</td>
</tr>
<tr>
<td>Blocks and Hooks</td>
<td>Each 1000 operating days (refer to engineer certifications)</td>
</tr>
<tr>
<td>Elevators</td>
<td>Each 500 or 1000 operating days (refer to engineer certifications)</td>
</tr>
<tr>
<td>Bails</td>
<td>Each 1000 operating days</td>
</tr>
<tr>
<td>Brake Linkages</td>
<td>Each 1000 operating days</td>
</tr>
<tr>
<td>Swivels</td>
<td>Each 1000 operating days</td>
</tr>
<tr>
<td>Tongs</td>
<td>Each 1000 operating days</td>
</tr>
<tr>
<td>Drilling Line</td>
<td>Within limits of Mega Jules Program</td>
</tr>
<tr>
<td>Raising Bridle</td>
<td>Every 2 years</td>
</tr>
<tr>
<td>BOP Slings</td>
<td>Each 1000 operating days</td>
</tr>
<tr>
<td>BOP Handling Slings</td>
<td>Every 2 years</td>
</tr>
<tr>
<td>Dog House Lifts</td>
<td>Each 1000 operating days (unless engineer certifications state different)</td>
</tr>
</tbody>
</table>

The above stated schedule is the minimum standard to be followed.

131.0  Inspections

Chinook Drilling is committed to establishing an inspection program and procedures equal to or in excess of the current industry standard. Capital above ground components shall be inspected in accordance with schedules and procedures outlined in the company’s Preventative Maintenance Program.
Sub-surface components shall be inspected as follows:

<table>
<thead>
<tr>
<th>COMPONENT</th>
<th>SCHEDULE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drill Pipe</td>
<td>After 75,000 meters if used - Doubles &amp; Singles</td>
</tr>
<tr>
<td></td>
<td>After 100,000 meters if new - All Rigs</td>
</tr>
<tr>
<td>Drill Collars</td>
<td>After 90 days of continuous use</td>
</tr>
<tr>
<td>Kelly Joints</td>
<td>With Drill Pipe</td>
</tr>
<tr>
<td>Substitutes</td>
<td>With Drill Collars</td>
</tr>
</tbody>
</table>

**NOTE:** These are meant to be a minimum inspection schedules only. Operator requirements and/or industry practice may require inspections on more frequent intervals.

**NOTE:** All drill tubulars exposed to H2S and other agents that, in combination with drilling mud, can cause pipe degradation including metal loss, embrittlement or stress hardening shall be inspected immediately after such occurrence takes place.

**NOTE:** All drill tubulars subjected to abnormal stress such as whip stocking or high angle drilling for prolonged periods shall be inspected immediately after such occurrence takes place.

### 132.0 Drill Collar Inspection Discrepancy Reports

We request the following on all inspections of drill collars for the company:

- All drill collar inspection reports must indicate not only O.D, I.D, and connection but also length of each collar and a notation regarding the relief groove (RG - Relief Groove, STB - Standard)
- Each inspector shall prepare a written descriptive report of the drill collar string inspected and forward it with the invoice.

This report shall include:
- General string condition.
- Presence of galling, seal area damage.
- Condition/location/amount of hand banding.
- Evidence of poor torque practices.
- Type and location/depth of bore backs.
- Other physical damage (thread notching, use of improper handling tools, etc.)
- Number of spiral, slick, single or double zipped collars in the string.

We are committed to maximizing the useful life of our drilling rig tubular goods as well as continuing efficient drilling. Our inspection criteria and frequency ensure that we have a
continuous record of drill string reliability. As the only accurate source of data we look to you and your team of qualified inspectors to provide us with the most useful information available.

133.0 Code of Colors

<table>
<thead>
<tr>
<th>WHITE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Derrick</td>
</tr>
<tr>
<td>Inside Buildings</td>
</tr>
<tr>
<td>Inside Substructure</td>
</tr>
<tr>
<td>Hand Rails</td>
</tr>
<tr>
<td>416 GREY</td>
</tr>
<tr>
<td>Outside of Substructure</td>
</tr>
<tr>
<td>Floors</td>
</tr>
<tr>
<td>311 RED</td>
</tr>
<tr>
<td>Crown</td>
</tr>
<tr>
<td>Accumulator</td>
</tr>
<tr>
<td>406 BLUE</td>
</tr>
<tr>
<td>Outside of Buildings</td>
</tr>
</tbody>
</table>

All other components shall remain original manufactured colors.

134.0 Shut Down List

A shut down list for each specific rig/piece of equipment must be developed. It should include procedures for preventing freezing problems, theft, corrosion and/or contamination due to elements.

This list should include but not limited to the following:

- Engines, generators
- Drawworks, pumps, rotary tables, swivel, traveling blocks, crown blocks and derrick equipment.
- Mud systems, centrifugal pumps, lines, valves, desilters, shale shakers and decking.
- Fuel tanks, water tanks, lines, valves and pumps associated with each.
- Electrical cables, plug panels, junction boxes, cord ends, etc.
- Boiler and heating system.
- Accumulator, BOP stack, stack valves choke manifold and atmospheric degasser systems.
• Drill string including pick-up subs, drill collars, cross over subs, drill pipe, heavy-weight drill pipe, kelly cocks, inside BOP's, kelly and kelly bushing.
• Drillers controls, electric motors (DC and AC).
• Hydraulic systems air systems.
• Buildings and substructure.
• Camp, rig manager's quarters and any support units.

Basic shut down procedure should be discussed with the Superintendent and instituted at rig shut down for each of the above.

135.0 Purchasing Controls

Purchasing controls protect employees and contractors by ensuring all equipment, tools, and materials purchased, leased or rented meet government and accepted industry standards.

When purchasing equipment we ensure that equipment and supplies meet the following criteria.

• Equipment and supplies must meet the standards specified in occupational health and safety legislation. If the legislation does not specify a standard, we ensure that they meet the standards of a professional safety organization.
• Equipment and supplies must be compatible with the work environment and the task required of them.
• Equipment and supplies must be accompanied with the appropriate documentation, warranties, guarantees, and/or service contracts.

Equipment and supplies must be purchased from qualified vendors.

136.0 Vehicle Maintenance and Inspection

Chinook Drilling will maintain the following for each of its registered vehicles:

• a copy of work orders describing any repairs performed;
• a copy of scheduled maintenance reports prepared as part of the regular and continuous inspections and maintenance for all of the vehicles;
• a copy of any notice of any defect received from any manufacturer of the vehicle and records establishing that any defects have been corrected.