Conventional Pump Jack Safety
A Program Development Guideline
ENDORSEMENT

This document was developed by industry for industry. Enform gratefully acknowledges the support of the endorsing organizations in the development of this document.

- CAGC Canadian Association of Geophysical Contractors
- CAODC Canadian Association of Oilwell Drilling Contractors
- CAPP Canadian Association of Petroleum Producers
- CEPA Canadian Energy Pipeline Association
- PSAC Petroleum Services Association of Canada
- EPAC Explorers and Producers Association of Canada

ABOUT ENFORM

Enform is the upstream oil and gas industry’s advocate and leading resource for the continuous improvement of safety performance. Our mission is to help companies achieve their safety goals by providing practices, assessment, training, support, metrics and communication.

AVAILABILITY

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ACKNOWLEDGEMENT

Enform gratefully acknowledges the many individuals who volunteered their time and effort to complete this document.

DISCLAIMER

This document is intended to be flexible in application and provide guidance to users rather than act as a prescriptive solution. Recognizing that one solution is not appropriate for all users and situations, it presents generally accepted guidelines that apply to industry situations, as well as recommended practices that may suit a company’s particular needs. While we believe that the information contained herein is reliable under the conditions and subject to the limitations set out, Enform does not guarantee its accuracy. The use of this document or any information contained will be at the user’s sole risk, regardless of any fault or negligence of Enform and the participating industry associations.

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Preface

Purpose

The purpose of this document is to not to provide a definitive safety checklist for use with Pumping Units, but rather to offer a reference document to allow an organization to create their own procedures and practices that cover the safety requirements of a pumping unit. All employers regardless of jurisdiction are required to conduct and participate in site specific orientations to cover the specific hazards, conditions, equipment, procedures, rules and regulations where the work occurs. When referencing Pumping Units, it is implied that all pump jacks are included, be them Conventional, Hydraulics and Rotoflex or Special Geometry.

How to Use This Guideline

This guideline can be used by any organization within or supporting the oil and gas industry whose workers may be exposed to Pump Jacks. Companies may use this guideline to:

- Assist them in determining the need for a pump jack safety program and in developing their pump jack safety program.
- Perform an audit or gap analysis of existing systems.
- Apply the templates, processes, tools and additional resources provided in this guideline to improve their program.

This guideline can also be utilized by producers, service companies, transportation companies, drilling, seismic and exploration operations. Examples of these include, but are not limited to:

- Oil and gas exploration and production companies
- Electrical and instrumentation service providers
- Construction service providers
- Cathodic protection service providers
- Oil & Gas service companies

Limitations

This guideline has been developed with reference to industry related publications. However, it is not exhaustive. The reader should defer to published standards and applicable legislation for guidance. This document is intended as a guideline, and not as a compliance standard.
Revision Process

Example statements for this section:

Industry Development Guidelines (IDGs) are developed by industry for industry. Enform acts as an administrator and publisher.

Each IDG is reviewed on a three year cycle. Technical issues or changes may prompt a re-evaluation and review of this IDG in whole or in part. For details on the IDG creation and revision process, visit the Enform website at www.enform.ca.

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1.0 Introduction

1.1 Scope

This document is not designed to interpret Canadian Provincial Occupational Health and Safety laws. It is not intended to be used in court. The information in this document is intended for general use and may not apply to every circumstance. It is not a definitive guide to government regulations and does not exempt any employer from their responsibilities under applicable legislation. Where a conflict exists between this document and any applicable governmental Act, Regulation, or Code, the legislation shall have precedence.

Industries under federal jurisdiction - such as inter-provincial pipelines, inter-provincial transportation, broadcasting and telecommunications, are governed by The Canada Labour Code. If you work in a federally regulated industry, please contact the appropriate agency for information or visit the Human Resources and Skills Development Canada web site at: www.hrsdc.gc.ca.

This document does not contain Company specific, Prime Contractor Specific or Site Specific information.

1.2 Industry Activities

There are five types of work associated with pumps. These are described as; installation and decommissioning, service work (service) to connect or disconnect the pump to the polish rod and down-hole assembly, maintenance work (maintenance) to repair and maintain the pump, optimization of the pump (optimization) to increase efficiency, and minor and major inspections (inspection) to monitor the equipment. Each of these activities is briefly described below.

1.2.1 Installation and Decommissioning

This work involves loading/unloading equipment and assembly/disassembly of the pump unit. The pump units are brought in to the lease site on flatbed trucks and off-loaded. The components of the pump unit include large heavy metal pieces that need to be lifted safely to offload them. Installation work often involves the core pump crew as well various specialists.

1.2.2 Service

This work involves the connection or disconnection of the pump to the polish rod and down-hole assembly. This work is performed after installation and prior to decommissioning. It is also completed in preparation for down hole well servicing work. The pump service work is typically completed by the core pump crew and with more involvement of the prime contractor representatives and operators.
1.2.3 Maintenance

Maintenance work consists of regular work required to keep the pump in operational condition. This involves fluid changes, lubrication and parts repair and replacement. Sample tasks may include: bearing greasing, part replacements, and brake adjustments. Maintenance work is usually completed by the core pump crew.

1.2.4 Optimization

Many pumps are equipped with specialized equipment that is used to calculate efficiencies. This data is analyzed by a production optimization team and work is then completed that is designed to optimize the efficiency in equipment operation and fluid production by the pump unit. Optimization work may include; altering the stroke length, adjusting the weight distributions, and adjusting the speed of the pump. It may also involve increasing or decreasing the size (maximum torque) of the pump on site. Optimization work involves the core pump crew.

1.2.5 Inspection

Pump inspections may be minor and major. Minor inspections are completed on a regular, often daily, basis. The exact schedule for minor inspections is set by the prime contractor. Minor inspections usually involve visual and auditory reviews of the equipment operating, as well as fluid checks. Occasionally minor maintenance work may be performed as part of a minor inspection job. Minor inspections typically involve one or two workers (an operator with or without an operator’s assistant). Major inspections are typically completed once or twice per year. The frequency is determined by the prime contractor. Major inspections involve a more thorough review of fluids and equipment. Some maintenance work (minor repairs and greasing of components) may also be performed as a part of major inspection. Major maintenance work is typically completed by a full pump crew. Some service provider companies specialize in this major inspection work.
2.0 Pump Safety Best Practices

This guide is not intended to provide a comprehensive safety checklist- it is assumed that all workers on-site have undergone full training as required by the necessary Occupational Health and Safety regulations. For general safety orientation requirements, please reference Enform’s 2012 General Safety Orientation for the Oil and Gas Industry.

It is expected that every company and its contractors create a specific safety program that incorporates company policies, practices, and procedures. Further expectation is that any and all risks on site are identified and mitigated to the company’s best intent. With regards to pumping equipment, reference should be made to the equipment manufacturer’s specifications as well as industry best practices as outlined in this guideline.

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3.0 Pre-Job Planning

Safety planning and risk mitigation begins far in advance of arriving on the job site. Job pre-planning meetings and site reviews need to be completed on every site to assess the hazards and work required before work starts. Currently the process is largely a paper-based review. A flow chart is provided in Appendix 2 to illustrate the steps require in pre-planning the various types of work that may be performed on a pumping unit.

Information regarding the equipment should also be available to the service provider during the pre-job planning meeting. Pre-job planning should include review of pre-written work procedures that are then tailored to the field site requirements of each job site and verbally communicated to the pump crew. These pre-written procedures could be accessible, either electronically or paper based. These pre-written procedures should be taken from manufacturer operator manuals and/or created by the service company or the prime contractor. They should address the required order of tasks and important safety information including energy isolation procedures.

On site, pre-job safety meetings should also include a walk around of the site to thoroughly analyze hazards and equipment and discuss the work plan including equipment placement and laydown before work starts. Following the review any required paperwork should then be completed. Examples of Pre-Job Planning and Job Safety checklists are included in Appendices 3 and 4.

The following areas should be covered in Pre-Job Planning and Pre-Job Safety meetings:

1. Scope of the work: what are we here to do? What equipment is required?
2. Work Permit from the site owner- should identify known hazards based on site.
3. Identify, mitigate and control the obvious hazards- hazard would be dependent on the scope of work and the area. Examples include but are not limited to:
   - Weather
   - Surface conditions
   - Wind
   - Overhead power lines
4. Anticipate Unseen Hazards
   - Potential well control situations
   - Pressure (equipment, piping, valves, hydraulic lines/ accumulators)
   - H2S
   - Faulty Electrical Connections
   - Mechanical Problems
   - Buried hazards
   - Etc.
5. **Review of Job Plan On Site**
   - Complete Job Safety and Emergency plan
   - Ensure there is lift Plan if required (see appendix 5 for sample)
   - Review Pre-Job checklist (see appendix 3 for sample)
   - Responsibilities and roles - communicate expertise and those in training/competencies of those involved. Verify training/tickets/skills
   - Communicate to all members of work group and everyone else on the worksite

### 3.1 Zero Energy Procedure

A first step in any work on Pumps involves energy isolation. Typical energy isolation procedures includes the following: machine control centre shut-down and lockout; lockout of the energy source (either electric or gas motor); locking the brake; using the locking pawl if one is available on that type of equipment; chaining the sheave; using a rod clamp; and using the crane to support the weight of equipment when required. Special types of equipment, such as a walking beam compressor, may require additional procedures to isolate the energy.

The following industry best practices should be adhered to:

- *Always follow the regulatory requirements and your company procedures*
- Ensure there is always a safe way into and out of the source of potential energy exchange.
- Lock out of prime mover: *first step always.*
- *Never rely on the brakes as your only source of isolation.*
- If weights move after ratchet style boomer is disengaged, get picker truck to lower weights or use alternate measures to ensure workers are not placed at risk
- If integrity of engineered lifting point can be verified - it may be used. If unsure, *DO NOT USE.*
- Never enter path of the potential swing of the weights.
- If pulleys cannot be secured, you may wrap chains around each weight arm and walking beam arm. Secure with a ratchet style boomer and lock out; lock and scissors on both sides.
- Having the counter weights at 6:00 is the preferred method, however, if it is not possible other engineered and approved methods should be used (strap method, clamping the rod off, brake pawl).
Each company should have their own policy that ensures it meets minimum regulatory requirement for lock out procedures based on the equipment used and company policy. This procedure must use at least two (2) isolation methods, and it is **strongly recommended** to use three (3) methods to ensure a Zero-Energy safe state. The first line of defense should be the manufacturer’s specification. Failing that, here are some suggested methods (in no particular order):

(This is strictly for the PUMP itself, not the prime mover)

1) Chain and Ratchet Boomer: Chain must comply to the size and the weight of the unit being serviced

Photo Credit: R&L
2) Brake Pawl- if available (engineered by the manufacturer)

![Brake Pawl](image1)

Photo Credit: Lufkin

3) Hydraulic Fork into the sheave- ensure the bracket is manufactured for that pump.

![Hydraulic Fork](image2)

Photo Credit: Armorjack (armorjack.com)
4) Rod clamp- proper size for the pump and the counterweight MUST be in 6:00 position to use this method.

Photo Credit: R&L
5) Disconnect the bridle from the rod string (if the scope of work and situation warrants)

3.1.1 Additional Safety considerations for specific tasks:

**Assembling/ de-assembling the Unit:**
- Follow the **lift plan** (see appendix 4 for sample).
- Pay special attention to **ground conditions**.
- **Lifting points**- newer units have engineered lifting points (however you must ensure they are inspected and approved). If the history of the lift point is not known- **DO NOT USE IT!** Many older units do not have manufactured/ engineered lifting points.
- Re-torque as per OEM specification to ensure the equipment is functioning properly.
Appendix Conventional Pump Jack Safety

Maintenance and inspections:
- Safe Work Permit or site turnover from the site owner.
- Follow all safe work/ regulatory/ company policies and procedures.

Rig Servicing:
- Follow all safe work/ regulatory/ company policies and procedures.
- Ensure you have JSA’s and that they have been reviewed prior to undertaking the task(s).

Removing or installing Horsehead.
- Ensure the service crew is familiar with the recommended procedure for the unique pump. The preferred and safest method is to use a picker and crew to remove it safely (captured in JSA).
- Ensure the head is back on properly and functioning as required.

3.2 Ensure Proper Lifting Equipment

When using lifting equipment, complete a lift plan (see sample in appendix 5). Most importantly, follow all existing regulations and legislation. This guideline recommends that you **DO NOT USE** eyelets or eyebolts as lifting point on pump jack horseheads unless the integrity and history can be verified.

3.3 Work Practices

The purpose of Personal Protective Equipment (PPE) clothing and equipment is to shield or isolate individuals from the chemical, physical and biological hazards that may be encountered at a work site. Personal protective equipment provides a final barrier between the worker and a potential hazard, which could threaten personal health and safety.

Ensure that all industry required PPE including (but not limited to): Hardhats, Safety Glasses with Side Shields, Safety Toed Boots, and hearing protection which conform to CSA standards or an approved equivalent and are visually inspected prior to use.

Job Specific PPE may be required as determined by policies and procedures and job specific risk assessment.

Specialized Equipment: Man baskets, gas monitors, harnesses; ensure are all inspected and conforming to regulated/OEM requirements.

Well Maintained Tools: Ensure use of hand and power tools of proper size and type; proper size & type lift slings, chains or straps (inspected and tagged). Most importantly remember to “use the tool for its intended purpose”.

November 2013
3.4 Training and Competency

Competency refers to the culmination of the skills, knowledge, training, and experience possessed by workers that allow them to be capable to complete the work required without supervision or with only a minimal degree of supervision. Competency requirements can be reflected in a formal competency profile that lists the required job tasks and describes the necessary skills, knowledge, training and experience required to successfully complete them.

Currently there is not a standardized training program for employees working in the pump industry. A number of programs related to work on pumps includes; Enform's Artificial Lift Systems course, Lufkin's Pumping Unit Operation and Maintenance training course, and Weatherford's Artificial Lift course and Weatherford’s Pumping Applications training course. Each of these courses is approximately 3 days in length. Many service companies have a well development on-the-job training and competency development program (appendix 6 provides a sample competency assessment checklist). It is the responsibility of the Project Foreman/Supervisor to ensure workers on site are competent to be completing the tasks required. Appendix 6 includes a sample assessment of the skills and competencies required on site and an assessment checklist.

The following are the typical job roles that may be involved on a pumping site:

3.4.1 Prime Contractor Representative

Prime contractor representatives are responsible for ensuring the service provider is following prime contractor processes and procedures. This individual may work directly for the prime contractor or may be a representative contractor hired by the prime contractor.

3.4.2 Operator

This individual may work for a service company but usually works for the prime contractor. They are responsible for daily inspections and may be required to start the equipment after maintenance or service work is completed.

3.4.3 Project Foreman/Supervisor

The Project Foreman is responsible for supervision of all work on site. Other titles for this position could include: supervisor, site supervisor, operation supervisor, foreman, site foreman, crew foreman, and others. The Project Foreman typically works for the service provider company.
3.4.4 Service Technician

The service technician reports directly to the project foreman and is responsible for completion of the general work on site as directed. Other titles include: swamper, labourer, floor hand, roughneck, crew, helper, assistant, and others. There is typically no formal certification or apprenticeship program required for this position.

3.4.5 Crane Operator

The crane operator typically reports directly to the project foreman. This individual is responsible for all safety, inspections, upkeep and operations of the crane. Other job titles include boom truck operator and mobile crane operator. For the purposes of this report, the crane operator is the individual operating the equipment that manipulates pump parts regardless of the size of the crane. This job designation requires journeyman certification.

3.4.6 Crane Operator’s Assistant

The crane operator's assistant reports directly to the crane operator and indirectly to the project foreman. Other job titles for this position include picker assistant, picker apprentice, and assistant. This position is typically an apprentice position.

3.4.7 Specialists

There are a variety of specialists on site depending on the work being completed. These specialists may work for the prime contractor or service provider, or work for a different service provider company. Certification requirements differ for each of the specialist positions.

3.5 Regulations

A well-established occupational health and safety regulatory framework has been established in Alberta, British Columbia and Saskatchewan. The Occupational Health and Safety (OHS) legislation in Alberta consists of the following elements; Occupational Health and Safety Act, Regulation and Code. In British Columbia the OHS legislation consists of Part 3 (Occupational Health and Safety) of the Workers Compensation Act and OHS Regulations. In Saskatchewan the Occupational Health and Safety legislation consists of the OHS Act and Regulations. The OHS legislation provides the framework and defines the responsibilities for workers, supervisors and employers to work safely and follow safe work practices. The legislation also defines the prime contractor responsibilities. It is the supervisor’s obligation to ensure current regulation is adhered to.
3.5.1 General Duties

In Alberta, the OHS Act Section 2 (Obligations of employers, workers, etc.), outlines the roles and responsibilities of employers and workers with regards to ensuring a safe work environment. In British Columbia, the Workers Compensation Act defines and describes the general duties of employers and employees (Part 3, Division 3 – General Duties of Employers, Workers and Others). In Saskatchewan, Section 3 of the OHS Act, General duties of employers outlines the employer’s responsibilities. Worker responsibilities are detailed in Section 4 of the Act (General duties of workers).

3.5.2 Specific Applicable Regulations

In Alberta, the Code describes the general requirements related to work on pumps and general site work. Some of the relevant sections include:

- Part 2 Hazard, Elimination and Control;
- Part 6 Cranes, Hoists and Lifting Devices;
- Part 8 Entrances, walkways, stairways, ladders;
- Part 9 Fall protection;
- Part 14 Lifting and handling loads;
- Part 15 Managing the control of hazardous energy;
- Part 21 Rigging; and
- Part 22 Safeguards.

British Columbia has similar applicable sections. Some of the more specific requirements are detailed in:

- Part 10 - De-energization and Lockout;
- Part 11 - Fall Protection;
- Part 12 - Tools, Machinery and Equipment;
- Part 13 - Ladders, Scaffolds and Temporary Work Platforms;
- Part 14 - Cranes and Hoists; and
- Part 15 - Rigging.

Saskatchewan has similar generally applicable sections in the regulations. These are found in:

- Part X: Machine Safety (specifically, section 136 unattended and suspended machines,
- section 137 safeguards, and section 139 locking out);
- Part XII Scaffolds, aerial devices, elevating work platforms and temporary supporting structures;
- Part XIII Hoists, cranes and lifting devices;
- Part XIV Rigging; and
- Part XVI Entrances, exits and ladders.
Please see appendix 7 for an overview of the provincial legislation in Alberta, British Columbia and Saskatchewan that is applicable to pump work.

3.6 Conclusion

Safety is paramount to all work performed on pumping units. By following the rules, regulations and best practices suggested in this guideline- each organization will be able to create their own policies, procedures and practices to help ensure worker safety on and around pumping sites.
Appendix 1: Pump Diagram Sample
Appendix 2: **Conventional Pump Jack Pre-Planning Flowchart**

This flowchart assists with decision making on pre-planning requirements
Conventional Pump Jack Pre-Planning Flowchart

Type of work is being performed on Conventional Pumping Unit

- Installation & Decommissioning
- Inspection and Maintenance
- Rig Servicing
- Optimization

Refer to the Guideline for a sample worker evaluation

Company has a Worker Training/ Competency program

All workers are trained, deemed competent and information is documented.

Complete and document Worker Evaluation

All workers understand their roles and responsibilities.

Procedures or JSA’s are available

Create procedures or JSA’s for the working being performed

Hazard assessment has been completed onsite with participation from all workers

Safe Work Permit or Turn over agreement is in place with site owner.

Review with all workers

Complete and document Worker Evaluation

Other items to be considered

Control of Hazardous Energy

Working at heights over 10 feet

Cranes and lifting devices used

Ladders and scaffolding

Safeguards

Other applicable regulations

Workers have individual locks and lockout list completed

Pre-use harness/ Lanyard inspections completed along with rescue plan

Create Lift Plan, Lifting points integrity has been verified, rigging has been inspected before use

Ladders are used for short duration work. Scaffolding has been inspected

Equipment isolation must occur if Safeguards are removed

Refer to Guideline for a list of other Specific Applicable Regulations

Refer to your specific Provincial Occupational Health and Safety Act/ Regulation/ Code for more detailed information regarding Work Preparation.
Appendix 3: Due Diligence Pre-Job Planning Checklist
### PRE-JOB CHECKLIST FOR WORKSITE SUPERVISION

**Supervisors Name:**

**Date:**

**Location:**

**Activity:**

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<tr>
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<th>Y</th>
<th>N</th>
<th>N/A</th>
<th>Comments</th>
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<tbody>
<tr>
<td>1. Do you know who the area operating authority is and how to contact them?</td>
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<td>2. Do you have the authority to proceed with work? (i.e. Construction Package for Grassroots site or Turnover Agreement for live Operating site)</td>
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<td>3. Has the site been correctly Turned Over to you? E.g. are you aware of the existing on-site hazards and how they will be managed?</td>
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<td>4. Have you identified yourself as Site Supervisor to all of those on site?</td>
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<td>5. If working in Saskatchewan, have you completed and posted the “Notice of Supervisor” form?</td>
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<td>6. If necessary, have you designated and identified an alternate supervisor in the event that you become incapacitated?</td>
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<td>7. Do you have a complete and thorough understanding of the scope of work to be conducted?</td>
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<td>8. Do you know the steps to be taken if there is a change in the work scope?</td>
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<td>9. Are the contractor(s) to be used on the COMPANY Approved Contractors list?</td>
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<td>10. Are ALL workers on site Level 3 oriented (field safety orientation)?</td>
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<td>11. Have you assessed worker competency? (verify the worker has the required certifications; e.g. crane operator’s certification) Is the worker fit for work?</td>
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<td>12. Have you identified new or young workers on the site and have you implemented risk controls to mitigate the associated risks (e.g. supervision, appropriate task assignment)?</td>
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<td>13. Are all workers (self included) aware of the “Right and Responsibility to Refuse Unsafe Work” legislation and the procedures to be followed in the event of a work refusal?</td>
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<td>14. Have you considered federal, provincial legislation and industry best practices (e.g. OHS)? For details refer to the EH&amp;S flash drive.</td>
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<td>15. During your Hazard Assessment, did you identify any hazards that require additional documentation to be completed or specialized procedures (ISA) to be implemented? E.g. Ground Disturbance Checklist, Working in Proximity to Overhead PowerLine Critical Lift Plan, Fire &amp; Explosion Plan, LOTO etc. Have you communicated the identified hazards and controls to ALL stakeholders on and off site?</td>
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<td>16. In the event of an Emergency, do you know these initial emergency response steps and how to communicate this to the work crew?</td>
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<td>17. Have you completed and posted your Site Specific ERP and are all workers on site aware of their roles and responsibilities in the event of an emergency?</td>
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<td>18. Do you have the COMPANY Corporate Emergency Response call-in number at hand and does your alternate know the protocol?</td>
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<td>19. Consider and plan for continuous monitoring of the site to ensure compliance with safety standards are upheld. Implement a formal periodic inspection system</td>
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<td>20. Do you have all of the appropriate COMPANY documentation and tools required to conduct the work at hand?</td>
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</tr>
<tr>
<td>i. EH&amp;S policy</td>
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<td>ii. EH&amp;S manual</td>
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<tr>
<td>iii. Links to and copies of OHS legislation (BC, AB &amp; SK)</td>
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<tr>
<td>iv. Waste management guidelines</td>
<td></td>
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<tr>
<td>v. COMPANY Corporate ERP</td>
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<tr>
<td>a. Safe Work Agreements</td>
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<tr>
<td>b. Ground Disturbance Checklists</td>
<td></td>
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<tr>
<td>c. Hazard Assessment matrix</td>
<td></td>
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<tr>
<td>d. Working in proximity to overhead PowerLines</td>
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<tr>
<td>e. Near miss/hazard identification forms</td>
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<tr>
<td>f. ERP contact list</td>
<td></td>
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<tr>
<td>g. Confined space permits</td>
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<tr>
<td>h. Pre-job safety meeting forms</td>
<td></td>
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<tr>
<td>21. Do you believe that you have done everything reasonably practicable to protect the health and safety of the workers, the public, yourself and the environment?</td>
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</tbody>
</table>
Appendix 4: Job Safety Checklist (credit; ExxonMobil/Imperial Oil)
Job Safety Analysis (JSA)

1 Location

Date (dd/mm/yyyy)

Permit to work (if applicable): Type

Number

Description of task (include equipment numbers, if practical)

Emergency meeting point (EMP)

2 Task Hazard Assessment (THA): If the task is not managed with a permit to work, complete the THA form attached to this JSA (see Attachment 1). If the task is managed with a permit to work, completing the attached THA is optional.

3 JSA – Hazard Management: Specify basic task steps, for each step, identify potential incidents or hazards and hazard control(s). (Complete the Hazard-Control Implementation columns after the JSA is reviewed.) Note that:
   • assigning potential hurt levels (PHLs) in Step 7 is optional. Levels are: 0 (no hurt), 1 (minor hurt), 2 (moderate hurt), 3 (severe hurt), 4 (fatality) and 5 (multiple fatalities).
   • the assigned person in Step 12 must ensure hazard control is implemented before checking the check box and initialing beside the box

<table>
<thead>
<tr>
<th>4 Basic Task Steps (Number steps)</th>
<th>5 Potential Incidents or Hazards (What could go wrong?)</th>
<th>6 Hazard Control (How can harm be prevented?)</th>
<th>7 PHL (optional)</th>
<th>8 Hazard-Control Implementation</th>
</tr>
</thead>
<tbody>
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</table>

NOTE: If work scope or conditions change significantly, **stop the job**. Revise this JSA to address the hazards before proceeding.
## Job Safety Analysis (JSA) (cont’d)

<table>
<thead>
<tr>
<th>4 Basic Task Steps (Number steps.)</th>
<th>5 Potential Incidents or Hazards (What could go wrong?)</th>
<th>6 Hazard Control (How can harm be prevented?)</th>
<th>7 PHL (optional)</th>
<th>12 Assigned Person</th>
<th>15 Complete</th>
</tr>
</thead>
<tbody>
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</tbody>
</table>

### Required References:

Have relevant procedures, standards and safe work practices been reviewed?  
☐ N/A  ☐ Yes. If applicable, list or attach procedures.

### Risk Assessment:

Do existing procedures or work practices need to be modified to do this task, i.e., MOC is required?  
☐ Yes  ☐ No

Once hazard controls are implemented, will any hazards continue to present a significant risk, i.e., a scenario-based risk assessment is required?  
☐ Yes  ☐ No

If an MOC or a scenario-based risk assessment is required, **stop the job**. Contact the person in charge to do an MOC or scenario-based risk assessment.
Job Safety Analysis (JSA) (cont’d)

10 Personal Protective Equipment (PPE) Required: Check off the required PPE for the task, according to the THA or JSA – Hazard Management.

- Hard hat
- Face shield
- Chemical apron or suit
- Personal gas monitor
- Gloves – chemical
- Other
- Safety footwear
- Goggles
- Respirator
- Gloves – heat resistant
- Gloves – cut resistant
- Other
- Safety glasses
- Hearing protection – single
- SCBA or supplied air
- Gloves – leather
- Gloves – other
- Other
- Fire-retardant clothing
- Hearing protection – double
- Safety harness
- Gloves – impact protection
- PPE specified on MSDS

11 JSA Review: Pending confirmation of site conditions by the task leaders, I agree this JSA identifies the basic task steps, hazards and hazard controls.

JSA reviewer (Print name and sign) Company

13 Work-Site Verification: The work crew has inspected the work-site conditions and members confirm: this JSA addresses the hazards and necessary controls; adequate resources (e.g., people and equipment) are available to do the task safely; other people in the work area potentially affected by the work have been informed, and, if applicable, energy isolation has been verified and demonstrated.

Task leader or permit holder (Print name and sign) Company

14 Work-Crew Declaration: If this JSA is part of a permit-to-work pack, completing this section is optional.

I reviewed this JSA, understand my roles and responsibilities, have the required skills and knowledge to do the task and will comply with task instructions.

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
<th>Signature</th>
<th>Name</th>
<th>Position</th>
<th>Signature</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

Post-job review: A post-job review has been completed with crew members, and lessons learned have been documented for future reference.

16 Task leader or permit holder (Print name and sign) Post-job review is attached □ Yes □ N/A Date (mm/dd/yyyy)
# Job Safety Analysis – Task Hazard Assessment Form

This table does not include all possible hazards. Determine the hazards (main checkboxes) that are present for the task and identify the controls (smaller checkboxes). Also use the required PPE for the activity and conditions.

**NOTE:** If this task is managed with a work permit, the THA on the permit may be used in place of the THA below.

<table>
<thead>
<tr>
<th>PRESSURIZED EQUIPMENT</th>
<th>POOR LIGHTING or VISIBILITY</th>
<th>PERSONNEL</th>
<th>CONFINED SPACE</th>
<th>SIMULTANEOUS OPERATIONS (SIMOPS)</th>
<th>WEATHER</th>
<th>IGNITION SOURCES</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISO</td>
<td>Provide alternative lighting</td>
<td>Provide induction or training for new workers</td>
<td>Discuss confined-space entry safe work practice</td>
<td>Follow SIMOPS matrix</td>
<td>Implement controls for slippery surfaces (specify)</td>
<td>Remove or manage combustible materials</td>
</tr>
<tr>
<td>LOTO</td>
<td>Wait until visibility improves or defer</td>
<td>Mentor, coach, or supervise</td>
<td>Monitor access and entry</td>
<td>Complete MOC for deviation from SIMOPS restrictions</td>
<td>Provide fire-fighting equipment</td>
<td>Provide fire-fighting equipment</td>
</tr>
<tr>
<td>Depressurize, drain, purge and vent</td>
<td>Verify competencies, skills, and experience</td>
<td>Protect surfaces from inadvertent contact</td>
<td>Establish interface between groups</td>
<td>Construct a fire-safe habitat</td>
<td>Provide a fire watch during and after hot work</td>
<td></td>
</tr>
<tr>
<td>Relieve trapped pressure</td>
<td>Address applicable hazards (e.g., fatigue, exhaustion, and restricted space)</td>
<td>Do not locate mobile engines near confined space</td>
<td>Use barriers and signs to segregate activities</td>
<td>Provide a fire watch during and after hot work</td>
<td>Conduct continuous gas testing</td>
<td></td>
</tr>
<tr>
<td>Avoid auto-refrigeration when depressurizing</td>
<td>Manage multiple languages</td>
<td>Provide observer</td>
<td>Have permit counter signed by leader of affected groups</td>
<td>Bond and ground for static electricity or cathodic protection</td>
<td>Bond and ground for static electricity or cathodic protection</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>HAZARDOUS SUBSTANCE</th>
<th>POTENTIAL SPELLS</th>
<th>EQUIPMENT HOT or COLD</th>
<th>HIGH NOISE</th>
<th>FALLING/ DROPPED OBJECTS</th>
<th>LIFTING EQUIPMENT</th>
<th>WORK AT HEIGHTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drain and purge equipment</td>
<td>Dry equipment</td>
<td>Heat or cool equipment before work starts</td>
<td>Wear cold-weather gear</td>
<td>Use signs and barriers to restrict entry or access under work at elevation</td>
<td>Confirms lifting equipment certification</td>
<td>Discuss working-at-heights safe work practice</td>
</tr>
<tr>
<td>Follow MSDS controls</td>
<td>Provide containment equipment at potential spill locations</td>
<td>Install barriers to avoid contact</td>
<td>Wear noise reduction gear</td>
<td>Obtain approval for lifts over processing equipment</td>
<td>Verify fall restraint and arrest equipment certification</td>
<td>Apply safety equipment certification</td>
</tr>
<tr>
<td>Implement health-hazard controls (e.g., for lead, asbestos, H2S, iron sulfide dioxide and NORM)</td>
<td>Have spill clean-up materials and equipment on hand</td>
<td>Provide warning signs</td>
<td>Use &quot;quiet&quot; tools</td>
<td>Have a documented and approved lift plan</td>
<td>Other controls:</td>
<td></td>
</tr>
<tr>
<td>Test or analyze material</td>
<td>Restrain and isolate hoses when not in use</td>
<td>Implement cold-temperature or brittle-failure controls</td>
<td>Use sound barriers or curtains</td>
<td>Provide or use suitable communication techniques</td>
<td>Other controls:</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PORTABLE ELECTRIC EQUIPMENT</th>
<th>RADIATION HAZARD</th>
<th>MOVING OBJECTS/ EQUIPMENT</th>
<th>MANUAL HANDLING</th>
<th>EQUIPMENT AND TOOLS</th>
<th>VIBRATING EQUIPMENT</th>
<th>SLIPS/TRIPS/ FALLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inspect equipment for condition and test date</td>
<td>Restrict access – barriers and signs</td>
<td>Confirm machinery-guard integrity</td>
<td>Assess manual handling task</td>
<td>Inspect equipment and tools before using</td>
<td>Identify and shield un-even surface or projections</td>
<td>Keep exits clear</td>
</tr>
<tr>
<td>Implement continuous gas testing</td>
<td>Note personnel who might be affected</td>
<td>Provide protective barriers</td>
<td>Limit load size</td>
<td>Do not use metal tools</td>
<td>Secure or cover cables, cords and tubing</td>
<td>Keep doors, access points, and other exits clear</td>
</tr>
<tr>
<td>Protect electrical leads from impact or damage</td>
<td>Implement NORM controls</td>
<td>Use an observer to monitor proximity of people and equipment</td>
<td>Manage posture</td>
<td>Use protective guards</td>
<td>Clean up liquids</td>
<td>Keep lighting clear</td>
</tr>
<tr>
<td>Conduct RAD testing</td>
<td>Conduct RAD testing</td>
<td>Confirm stability of load and work platform</td>
<td>Control the work environment</td>
<td>Use sight tools and equipment for task</td>
<td>Barricade or rope-off openings and holes</td>
<td>Keep site clear</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>HIGH ENERGY or HIGH VOLTAGE</th>
<th>EXCAVATIONS</th>
<th>WASTE CLEANUP &amp; DISPOSAL</th>
<th>OTHER ENERGY SOURCES</th>
<th>MOBILE EQUIPMENT</th>
<th>OTHER HAZARDS</th>
<th>EMERGENCY RESPONSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Restrict access to authorized personnel only</td>
<td>Have an excavation plan or use safe work practice</td>
<td>Apply environmental-management practices</td>
<td>Assess equipment condition</td>
<td>Implement abrasive blasting controls (for equipment and practices)</td>
<td>Keep access route open</td>
<td>Keep egress route open</td>
</tr>
<tr>
<td>Discharge equipment and make electrically dead</td>
<td>Locate underground pipes or cables by hand digging</td>
<td>Locate underground pipes or cables by hand digging</td>
<td>Implement spring compression or expansion control</td>
<td>Prepare a dive plan</td>
<td>Keep shower and eye-wash stations accessible</td>
<td>Keep shower and eye-wash stations accessible</td>
</tr>
<tr>
<td>Observe safe-work distances for live cables</td>
<td>De-energize underground services</td>
<td>Clean up equipment and materials at site</td>
<td>Implement electromagnetic (radio) controls</td>
<td>Manage potential blocked or plugged equipment</td>
<td>Have a rescue plan in place</td>
<td>Have a rescue plan in place</td>
</tr>
<tr>
<td>Use flash-burn PPE suit</td>
<td>Optimize task to minimize waste production</td>
<td>Manage pressure or vacuum</td>
<td>Manage pressure or vacuum</td>
<td>Complete MOC for temporary connections or modifications</td>
<td>Keep emergency alarm, fire equipment and shutdown locations unobstructed</td>
<td>Keep emergency alarm, fire equipment and shutdown locations unobstructed</td>
</tr>
<tr>
<td>Use insulated gloves, tools and mats</td>
<td>Implement confined-space entry controls</td>
<td>Manage heat-generating processes</td>
<td>Use seismic-activity safe work practice</td>
<td>Implement abrasive blasting controls (for equipment and practices)</td>
<td>Prepare a dive plan</td>
<td>Prepare a diving plan</td>
</tr>
</tbody>
</table>

WJ/00572d 10 11 24
Attachment 1
Appendix 5: Lift Plan

DRAFT
# Lift Calculation Plan

<table>
<thead>
<tr>
<th><strong>JOB DESCRIPTION</strong></th>
<th><strong>DATE</strong></th>
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</thead>
<tbody>
<tr>
<td><strong>AREA CONTACT</strong></td>
<td><strong>S.W.P. #</strong></td>
</tr>
<tr>
<td><strong>LOCATION</strong></td>
<td><strong>J.T. #</strong></td>
</tr>
<tr>
<td><strong>OPERATOR NAME</strong></td>
<td><strong>CRANE SIZE</strong></td>
</tr>
</tbody>
</table>

**WEIGHT OF LOAD INFORMATION PROVIDED BY:**

### LIFT INFORMATION

<table>
<thead>
<tr>
<th><strong>WEIGHT OF LOAD</strong></th>
<th><strong>LBS</strong></th>
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</thead>
<tbody>
<tr>
<td><strong>ALLOWANCE FOR EXTRA WEIGHT</strong></td>
<td><strong>LBS</strong></td>
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<tr>
<td><em>(Scale, Sludge, Internals, Liquid etc.)</em></td>
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<tr>
<td><strong>WEIGHT OF RIGGING</strong></td>
<td><strong>LBS</strong></td>
</tr>
<tr>
<td><strong>WEIGHT OF BLOCK OR BALL</strong></td>
<td><strong>LBS</strong></td>
</tr>
<tr>
<td><strong>WEIGHT OF ATTACHMENTS</strong></td>
<td><strong>LBS</strong></td>
</tr>
<tr>
<td><strong>TOTAL WEIGHT TO BE LIFTED</strong></td>
<td><strong>LBS</strong></td>
</tr>
</tbody>
</table>

| **MAX. RADIUS TO BE USED** |
| **BOOM LENGTH** |
| **BOOM ANGLE** |
| **CAPACITY FROM CHART** | **LBS** |
| **% OF CAPACITY** | *(See example below)* |
| **EST. CLEARANCE BETWEEN BOOM AND SURROUNDING FACILITIES** |

### LIFT DIAGRAM

---

**EXAMPLE:**

- **TOTAL WEIGHT TO BE LIFTED:** 8,695 **LBS**
- **DIVIDED BY:**
  - **CAPACITY FROM CHART:** 15,000 **LBS**
- **X 100 = % OF CAPACITY:** 56.1%
Appendix 6: Competency Required for Pump Workers
**Employee's Knowledge in:**

<table>
<thead>
<tr>
<th>Knowledge Area</th>
<th>Excellent</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
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<tbody>
<tr>
<td>Lock, tag, and Try procedure</td>
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<tr>
<td>Chain &amp; Binder - proper securement</td>
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<tr>
<td>Can identify required PPE &amp; its importance</td>
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<tr>
<td>Importance of good house keeping</td>
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<tr>
<td>Knows what a JSA is and why we write them</td>
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<tr>
<td>Knows what a Hazard Assessment is</td>
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<tr>
<td>Knows what a Near Miss is</td>
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<td>Knowledge of H2S &amp; use of monitor</td>
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<td>Can identify unit parts &amp; bearings by name</td>
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<td>Proper reporting of accidents or incidents</td>
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<tr>
<td>Role of Mentor</td>
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<tr>
<td>Role of Spotter/ signal man</td>
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<tr>
<td>Tagline operation</td>
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<tr>
<td>Basics of rigging</td>
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</tbody>
</table>

Employee Comments

Employee Signature: ___________________________  Date: ________________

Supervisor Comments: ___________________________

Supervisor Signature: __________________________  Date: ________________

Safety Coordinator Signature: __________________  Date: ________________
# Appendix 7: Regulations in Alberta, BC & Saskatchewan

<table>
<thead>
<tr>
<th>OHS Regulation</th>
<th>Applies Specifically:</th>
<th>Applies In Certain Circumstances:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The Alberta Code</strong></td>
<td>Part 2 Hazard assessment, elimination and control; Part 6 cranes, hoists and lifting devices; Part 8 Entrances, walkways, stairways, ladders; Part 9 Fall protection; Part 14 Lifting and handling loads; Part 15 Managing the control of hazardous energy; Part 21 Rigging; Part 22 Section 310 (2) Moving parts.</td>
<td>Part 3 Specifications and certifications; Part 4 Chemical hazards; Part 7 Emergency preparedness and response; Part 10 Fire and explosion hazards; Part 11 First aid; Part 12 General safety precautions; Part 13 Joint work site health and safety Committee; Part 16 Noise Exposure; Part 17 Overhead power lines; Part 18 Personal Protective equipment; Part 19 Powered mobile equipment; Part 22 Safeguards; Part 23 Scaffolds; Part 24 Toilets and washing facilities; Part 25 Tools, equipment and machinery; Part 27 Violence; Part 28 Working alone; Part 29 WHMIS; and Part 37 Oil and gas wells.</td>
</tr>
<tr>
<td><strong>British Columbia Regulations</strong></td>
<td>Part 10 - De-energization and lockout; Part 11 Fall protection; Part 12 Tools, machinery and equipment - specifically section 12.16 rotating parts...exposed to workers must be guarded.; Part 13 Ladders, scaffolds and temporary work platforms; Part 14 Cranes and hoists; Part 15 Rigging.</td>
<td>Part 3 Rights and responsibilities; Part 4 General conditions; Part 5 Chemical agents and biological agents; Part 6 Substance specific requirements; Part 7 Noise, vibration, radiation and temperature; Part 8 Personal protective clothing and equipment; Part 16 Mobile equipment; Part 17 transportation of workers; Part 18 Traffic control; Part 19 Electrical safety; Part 23 Oil and gas; Part 32 Evacuation and rescue.</td>
</tr>
<tr>
<td><strong>Saskatchewan Regulations</strong></td>
<td>Part X: Machine safety; specifically, Section 136 unattended and suspended machines, Section 137</td>
<td>Part III General duties; Part V First aid; Part VI General health requirements; Part VII Personal protective equipment; Part VIII</td>
</tr>
<tr>
<td>Appendix</td>
<td>Conventional Pump Jack Safety</td>
<td></td>
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<tr>
<td>----------</td>
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<td></td>
</tr>
<tr>
<td><strong>safeguards, and Section 139</strong> locking out. Part XII Scaffolds, aerial devices, elevating work platforms and temporary supporting structures; Part XIII Hoists, cranes and lifting devices; Part XIV Rigging; Part XVI Entrances, exits and ladders.</td>
<td>Noise control and hearing conservation; Part IX Safeguards, storage warning signs and signal; Part XI Powered mobile equipment; Part XVII Excavations, trenches, tunnels and excavated shafts; Part XXI Chemical and biological substances; Part XXII Controlled products – workplace hazardous materials information system; Part XXV Fire and explosion hazards, Part XXIX Oil and gas.</td>
<td></td>
</tr>
</tbody>
</table>