

Interim Directive 91-03

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Heavy Oil / Oil Sands Operations

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1 Introduction

1.1 Purpose of This Directive

This directive amends certain minimum regulatory requirements for

- the drilling and servicing of heavy oil/in situ oil sands wells,

- equipment and spacing in the production of heavy oil/in situ oil sands, and
- measurement and accounting for heavy oil/in situ oil sands.

Heavy oil, for the purpose of this directive, is a crude oil product with a density of 920 kg/m³ or greater at 15°C. This crude oil density incorporates most of the areas of east-central Alberta, where heavy oil production operations are normally considered to occur.

These regulatory amendments are a result of a review of the recommendations from the Operating Practices Steering Committee (OPSC) for Heavy Oil/Oil Sands Operations. The OPSC has also developed Alberta Recommended Practices (ARPs) for heavy oil/oil sands operations, which will be available from the Petroleum Industry Training Service in April 1991. This directive to some extent overlaps the procedures and equipment outlined in the ARPs. However, it is necessary to formally regulate those matters listed in this directive.

Unless exempted by this directive or other AER approval, heavy oil/oil sands operations must be conducted in accordance with the *Oil and Gas Conservation Rules* and the *Oil Sands Conservation Rules*.

1.2 What's New in This Edition

This interim directive was first published in 1991 and has been edited in place a number of times. This new form is an interim attempt at making the document easier to read until its remaining requirements can be housed in more appropriate instruments. Sections that were previously rescinded have simply been removed, and contact and other organizational details have been updated. Section numbers have also changed from the original.

2 Drilling Blowout Prevention Requirements

2.1 General

The requirements listed below amend certain drilling blowout prevention requirements as listed in *Directive 036: Drilling Blowout Prevention Requirements and Procedures*, pursuant to section 8.149 of the *Oil and Gas Conservation Rules* as they apply to the drilling of heavy oil and in situ oil sands wells.

Notwithstanding surface casing reduction for heavy oil/oil sands wells, wells that have the potential for significant lost circulation, hole sloughing, high gas deliverability rates, or that may be influenced by a secondary recovery scheme must set surface casing and be drilled in accordance with the *Oil and Gas Conservation Rules* with a minimum Class II BOP system.

The blowout prevention and drilling requirements for oil sands core holes and evaluation wells in surface-mineable areas are specified in *Directive 036*.

2.2 Drilling Blowout Prevention System

- 1) Class I BOP System – The length of the bleed-off line may be reduced to 25 m from 50 m if the line terminates in a flare tank.

2.3 Blowout Prevention Requirements

A Class I BOP system must be permitted for the drilling of crude oil or crude bitumen with a density of 920 kg/m³ or greater and where a reduction in conventional surface casing setting depth has been approved by the AER.

3 Servicing Blowout Prevention Requirements

3.1 General

The requirements listed below amend certain servicing blowout prevention requirements as listed in *Directive 036* and *Directive 037: Service Rig Inspection Manual* as they apply to the servicing of heavy oil and oil sands wells.

A new servicing blowout system, Class IIA, has been developed for heavy oil/oil sands wells to replace BOP Class I (heavy oil) where the expected bottomhole pressure is less than 21 000 kPa and the expected H₂S release rate will be less than 0.001 m³/s. In addition, the criteria for well servicing BOP Class III for heavy oil/oil sands has been amended to a flow rate of 0.001 m³/s H₂S from an H₂S concentration greater than 10 moles per kilomole.

The directive also recognizes the different servicing requirements for heavy oil/oil sands wells under primary vs. secondary recovery where

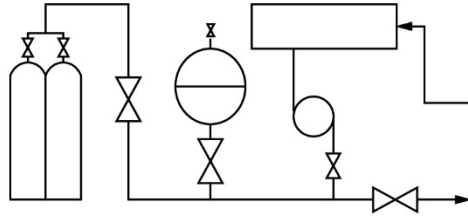
- a) PRIMARY RECOVERY WELL – for the purpose of this directive, defined as a well having a sandface reservoir pressure equal to or less than the hydrostatic pressure that would be exerted at the sandface if the well were filled with formation fluids.
- b) SECONDARY RECOVERY WELL (EOR) – for the purpose of this directive, defined as a well having a sandface reservoir pressure greater than that described above, by virtue of injection into the formation of fluids other than water at ambient temperatures. This includes all wells that are a part of an active EOR project approved by the AER and any offset wells within 1 km of an EOR well within the project.

3.2 Servicing Blowout Prevention System

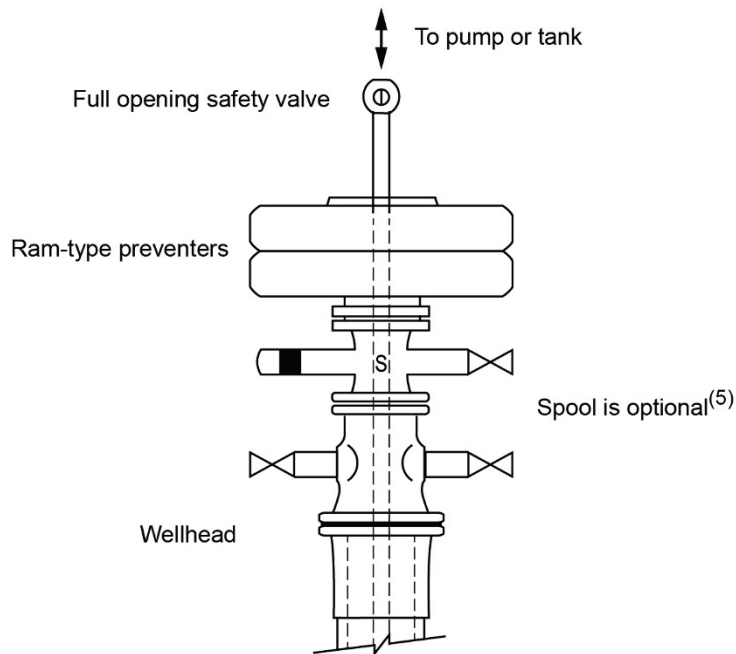
A Class IIA servicing BOP system must conform to the following minimum requirements:

- 1) Stack components as shown in figure 3.

ACCUMULATOR SYSTEM



BLOWOUT PREVENTION STACK



Notes:

1. Pressure rating of preventers is equal to or greater than formation or injection pressure.
2. The positioning of tubing and blind rams may be interchanged.
3. The preventer connection to the wellhead may be threaded.
4. If spool installed, the valve connection to spool may be threaded.
5. A flanged blowout preventer port (and valve) below the lowest set of rams may replace spool (valve may be threaded) on primary wells.
6. All threaded connections in the working spool shall be backwelded.
7. 50-mm kill line is required during the servicing of a secondary recovery well.

Figure 3. Servicing blowout prevention systems – Class IIA: Bottomhole or injection pressure $\leq 21\ 000$ kPa and H_2S release rate < 0.001 m³/s

3.3 Blowout Prevention Requirements

- 1) The servicing of a heavy oil/oil sands well must be conducted with
 - a) Class IIA BOP equipment where the bottomhole or injection pressure is less than or equal to 21 000 kPa and the maximum potential H₂S release rate for the well is less than 0.001 m³/s or
 - b) Class III BOP equipment as specified by schedule 10 of *Directive 037* where the bottomhole or injection pressure exceeds 21 000 kPa or the maximum potential H₂S release rate is equal to or greater than 0.001 m³/s.
- 2) The BOP components must be tested to the pressures specified in *Directive 037*. A 10-minute test must be conducted prior to servicing the first well of a program and
 - a) thereafter every 7 calendar days in a secondary recovery well servicing program or every 30 calendar days in a primary recovery well servicing program and
 - b) before servicing each well in a secondary recovery well servicing program, each BOP component must be tested for at least 2 minutes to the pressures referenced in *Directives 036* and *037*.
- 3) Bailing operations may be conducted to an open tank. The tank may be adjacent to the well but must be removed as soon as bailing operations are completed.
- 4) A blowout preventer capable of closing on the rod string is required while tripping rods on secondary recovery wells. The preventer must be hydraulically operated with the controls located no closer to the well than the driller's control panel. Should the preventer be operated using service rig hydraulics, an alternative method to operate the preventer must be provided with the controls located a minimum of 7 m from the well.

4 Production Equipment and Procedures

4.1 Fired Equipment and Engine Exhausts

- 1) No oil storage tanks, or desand and ecology pits, may be located within 25 m of a heavy oil/oil sands well unless approved by the AER or its authorized representative.
- 2) Tank heaters are permitted in heavy oil/oil sands storage tanks to facilitate shipping of the product.
- 3) Diesel engines operating within 25 m of an oil sands/heavy oil well, process vessel, or production storage tank must be equipped with an adequate air intake shut-off valve.

4.2 Prevention of Losses

- 1) Surface flow lines at single-well facilities must be adequately marked or buried to prevent damage from equipment working on lease.