

# Well Survey Requirements

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Directive PNG003

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Revision 1.0

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Governing Legislation:

Act: *The Oil and Gas Conservation Act*

Regulation: *The Oil and Gas Conservation Regulations, 2012*

Order: 504/15

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**Record of Change**

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## 1. Introduction

This Directive outlines the elements that are required in all survey plans for wells licensed by the Ministry of Energy and Resources (ER).

A survey plan must be submitted by a licensee, as part a well licence application, an as-drilled survey is required after completion of drilling for all wells except those that are drilled vertically.

### 1.1 Governing Legislation

This Directive should be used in conjunction with *The Oil and Gas Conservation Act (OGCA)* and *The Oil and Gas Conservation Regulations, 2012 (OGCR)*.

It is the responsibility of all operators, as specified in the legislation, to be aware of ER requirements and to ensure compliance with all requirements prior to submitting a well survey.

### 1.2 Definitions

**Bottom hole:** means the termination point of a wellbore.

**Boundary co-ordinates:** are measurements using a reference point of nearest boundaries of the Section.

**Directionally-drilled well:** is a well that is not vertical but does not meet the minimum criteria to be horizontal.

**Dwelling:** means a building occupied by a person on a temporary **or** permanent basis.

**Horizontally-drilled well:** is a well drilled with a productive length that is at least 80 degrees from vertical for 100 m.

**Intermediate casing point:** means point where the intermediate casing lands.

**Kickoff point:** means where an additional wellbore begins on a multi-bore horizontal well.

**Landing point:** refers to the point where the well path has reached horizontal or near horizontal position within the target pool, and is only applicable to a monobore horizontal well.

**Monobore:** means a horizontal well with a single string of production casing, with uniform diameter, cemented from total depth to surface.

**Rectangular co-ordinates:** are measurements using a reference point of the well origin.

**Target area:** means the specified area within a drainage unit allocated to one well completion for the purpose of producing oil or gas from a non-horizontal oil well or a gas well.

**Water body:** means a body of water or an area where water flows or is present, whether the flow or the presence of water is continuous, seasonal or intermittent, or occurs only during a flood.

**Wellbore:** means a path of drilled footage from the well origin (or kick off) to a terminating point.

## 2. Mandatory Components of a Survey Plan

For a survey plan to be accepted by ER, it must contain all the components listed in subsections 2.1 and 2.2 and must comply with all the requirements set out for them.

### 2.1 Basic Survey Plan Components

A survey plan must consist of the following components:

- Be in a scale acceptable to the minister;
- Have a unique identifier for each well shown on the survey as assigned by IRIS (CWI, UWI or Well Licence are acceptable);
- Be prepared from a survey made by a Saskatchewan Land Surveyor, within the meaning of *The Land Surveyors and Professional Surveyors Act*;
- Be dated, certified, and signed by the surveyor, with the signature duly witnessed;
- Have a survey date that is less than 12 months prior to the date of submission;
- Show the location of the proposed well origin in relation to any of the following items situated within 200 metres of the proposed well site:
  - The boundaries of the section;
  - Water bodies;
  - Mines, whether worked or abandoned;
  - Existing wells and abandoned wells;
  - Roadways, road allowances, railways, pipelines, power lines, and any other right of way;
  - Aircraft runways or taxiways; and
  - Structures of every kind;
- Show the elevation of the well site and the locations of:
  - The surface lease boundaries;
  - The access road; and
  - The target area (if applicable);
- Have all measurements and distances tied to:
  - A surveyed monument or evidence of a surveyed monument in a surveyed area; or
  - A surveyed base line, or
  - Some prominent topographical feature acceptable to the minister in an unsurveyed area;
- State in the legend the true East/West and North/South co-ordinates of the well site relative to the initial reference point used in the survey (section corner monument, surveyed base line, etc.);
- Existing wells and abandoned wells within the drainage unit(s) from which the proposed well is intended to produce;

- State in the legend the latitude and longitude of the well site, in North American Datum 1983 (NAD83).

For directionally-drilled, slant-drilled or horizontally-drilled wells:

- The proposed intermediate casing point (ICP) or landing point (LP) for horizontal wells only and the proposed bottom-hole location;
- In relation to the boundaries of the section; and
- In relation to the well origin by rectangular co-ordinates;
- Horizontal wells do not need to show a target area on the survey.

## 2.2 Additional Survey Plan Requirements

In addition to the above basic components, a survey plan must also include the following:

- Complete drawings of all quarter sections where the surface well origin and entire directionally-drilled (DD) or horizontal (HZ) wellbores are located.
- All applicable linear measurements, any midsection bends, corner angles and the bearing of at least one adjacent boundary for the quarter sections referred to in the component above.
- Cartesian co-ordinates, referenced from the nearest section corner to the well origin location. These co-ordinates may not necessarily be tied to a survey monument.
- Boundary co-ordinates, referenced from the nearest boundaries of the section to the:
  - Well origin location;
  - Bottom-hole location of all wellbores associated with all wells;
  - ICP/LP of HZ wells;
  - Kickoff point of all subsequent wellbores of HZ wells;
  - Target completion point of DD wells.

*Note:*

- Wells located within partial sections are always referenced from the east side of the section.
- For wells where the surface well origin and bottom hole are not contained within the same quarter section, the surface and bottom hole co-ordinates must be referenced to their respective quarter section boundaries.
- Wells with an origin or bottom hole located within a road allowance must reference the boundaries of the adjacent LSD for land description. Wells on a road allowance running north-south must reference the LSD immediately to the east. Wells in an east-west road allowance must reference the LSD immediately to the north.
- Wells located on an LSD boundary must reference the lower LSD as the bottom hole or origin location.
  - Rectangular coordinates, referenced from the well origin to the:
    - Bottom hole for all DD and HZ wells and for every bore of a HZ well;
    - ICP/LP of all HZ wells;
    - Kickoff point of all subsequent bores;
    - Target completion point of all DD wells.
- If applicable, a reference to the convergence angle in the legend. This is necessary in order to obtain local geodetic bearings referenced to the meridian through well origin.
- Residence sketch, showing all public facilities and dwellings within 1.5 km of the well origin.

**3. “As Drilled” Survey Plan Requirements**

Once a well is drilled, an “as drilled” survey plan for all DD and HZ wells must be completed. These “as drilled” surveys must include:

- All the requirements listed above for proposed survey plans;
- The completed interval for DD wells
- First and last perforation points for a monobore HZ well; and
- The well CWI