Government of Saskatchewan

Well Survey Requirements

Directive PNG003

November 2015

Revision 1.0

Governing Legislation:

Act: *The Oil and Gas Conservation Act*

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

Record of Change

Revision	Date	Author	Description
0	September, 2015	PNG	Draft
1.0	November, 2015	PNG	Live version, updated wording, added directive number.

Contents

1. Introduction

This Directive outlines the elements that are required in all survey plans for wells licensed by the Saskatchewan Ministry of the Economy (ECON).

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 Ministry 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 ECON, 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