

Directive: Casing and Cementing Requirements

Directive PNG005

May 2018

Revision 2.0

Governing Legislation:

Act: *The Oil and Gas Conservation Act*

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

Order:

Record of Change

Revision	Date	Description
0.0	September, 2015	Draft
1.0	November, 2015	Final version, updated directive number, updated appendix format.
2.0	May, 2018	Changes to pre-set casing

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1. Introduction

This Directive outlines the requirement regarding cementing and casing requirements for oil and gas wells in Saskatchewan.

Questions concerning the requirements set out in this document should be directed to the PNG support line at 1-855-219-9373.

2. Definitions

IRIS means the Integrated Resources Information System, through which industry performs business activities and regulatory tasks.

3. Governing Legislation

The requirements set out in this Directive are based on regulations in *The Oil and Gas Conservation Regulations, 2012* (OGCR).

It is the responsibility of all operators, as specified in the legislation, to be aware of and to ensure compliance with these requirements.

If a licensee is aware of any cementing or casing requirements set out in this Directive or in the OGCR that are not being met in one or more of their wells, they must inform the Ministry of Energy and Resources (ER) as soon as the non-compliance is identified. ER will then consider the most appropriate action to take to address the non-compliance.

4. Surface Casing Requirements

Current surface casing requirements are listed below with the exception of those areas described in Appendix 1 where additional requirements must be followed.

The minimum requirements for surface casing are as follows:

- surface casing meeting American Petroleum Institute specifications must be used in all wells;
- in every well drilled, sufficient surface casing must be run to reach a minimum depth that is equal to the deepest of:
 - (i) 20 metres below the base of the glacial drift;
 - (ii) 10% of the projected total depth of the well; and
 - (iii) 75 metres;
- surface casing must be cemented in place by the pump and plug method or by the displacement method, with sufficient cement to circulate to the top of the hole; and
- cement must be allowed to set under pressure for at least eight hours before the plug is drilled.

If a float collar or guide shoe is used in setting surface casing, pressure at the surface may be released immediately on completion of the cement job but only if there is no bleed-back.

No surface casing shall be removed from any well.

The operator of a well that is completed to produce oil or gas or to inject fluid shall leave the annulus between the second casing string and the surface casing open to the atmosphere.

The annulus vent line must:

- a) have a minimum diameter of five centimetres;
- b) extend at least 50 centimetres above ground level;
- c) terminate so that any flow is directed either in a downward direction or parallel to the ground;
- d) contain an open valve; and
- e) have a working pressure rating for all parts of at least 23 kilopascals for every metre of depth of the surface casing.

An operator may apply to the minister through IRIS for approval of any variation to the requirements above.

5. Presetting Surface Casing Requirements

ER allows for presetting surface casing without prior approval. In these cases, the main hole may be drilled with a subsequent rig. Presetting surface casing must be done in accordance with the following requirements.

1. The well licence application must indicate the use of preset surface casing.
2. Casing centralizers must be run 3 metres off bottom, on top of second joint, and every third joint thereafter.
3. The surface hole must be drilled to a minimum depth as determined in section 2 above and casing cemented in place at one location prior to moving the rig to another location.
4. A third-party (rather than surface-casing rig) must conduct cementing operations unless the following conditions can be met:
 - a) Equipment with the capability to batch mix and agitate a minimum volume of 50% excess cement (and additives if necessary) required to cement the depth and diameter of surface casing to surface. Returns of the surface casing cement must be recorded for documentation of casing details in IRIS;
 - b) Obtain and retain a laboratory analysis that indicates the thickening time and compressive strength of the cement to be utilized in the surface casing. Cement used must be of oil well blend, designed specifically for oil well operations i.e.: Class G. This laboratory analysis must be available upon ER request;
 - c) Obtain and document samples of wet and dry cement mix prior to and during the cementing procedures. This documentation must be available upon ER request;

- d) A plug-loading head must be utilized to minimize the introduction of air into the casing while cementing;
 - e) Monitor wellbore obligations to determine if a surface casing cement bond log is required to ensure surface casing cement integrity; and
 - f) The well is not intended to be used in project wells, (e.g. Enhanced oil recovery operations, Thermal, ASP, THAI, CO₂, etc.)
5. Loss of circulation during drilling or primary cementing of surface hole must immediately be reported to appropriate field office , and may be subject to additional logging requirements, remedial cementing or required to be abandoned, at the discretion of the Ministry.
 6. A designated company representative must be present during pre-set operations including drilling, landing of surface casing and cementing operations, and that representative must attach the preset casing details in IRIS or as required by ER.
 7. Drilling to the licensed total depth of the well must be completed within one year of the issued date of the license, otherwise the well must be abandoned at the discretion of ER.
 8. If the one year from licence issue date has expired, application to abandon must be completed and submitted through IRIS for approval to abandon the preset surface casing within 90 days.

6. Production Casing and Adequate Equipment Requirements

No equipment shall be used in drilling or completing a well unless it is in good condition, and production casing must meet American Petroleum Institute specifications and must comply in all respects with the specifications set out in the licence issued for the well and with any further specifications of the minister.

Production casing is required to be cemented by the pump and plug method, the displacement method or any other approved method, and the cement must be set for at least 24 hours and properly tested by the pressure method before the plug is drilled out or the well perforated.

If production casing is run through a porous stratigraphic unit or a stratigraphic unit containing fresh potable water not protected from invasion by other fluids, the stratigraphic unit must be cemented off by an approved method.

In completing a well, the operator shall adopt methods and install equipment that the minister may specify.

If it appears to the minister that any equipment or casing used in drilling or producing a well is inadequate, defective or hazardous, the minister may require the replacement or reconditioning of that equipment or casing and may order the suspension of operations until the required action is taken.

The minister may, on application, approve the use of production casing that does not meet American Petroleum Institute specifications.

Well-head equipment must be:

- a) maintained in good working order; and
- b) installed in a manner in which the tubing, casing and static bottom hole pressures may be obtained at any time by the minister.

For all areas of Saskatchewan, production or intermediate casing must be cemented into the next string of casing.

Licensees must document that any use of non-American Petroleum Institute (API) casing meets well-design requirements, and a licensee may be required to supply documentation to ER supporting this fact, otherwise licenses may be cancelled or the well may be suspended.

Wellbore and casing integrity must be suitable for the purpose for which the well is being used, independent of the intended use at the time of drilling.

Non-API casing (I-55) may not be used in wells penetrating the top of the Second White Specks Formation. In this case, the production casing must meet or exceed current API-Q1 specifications and must be cemented to surface.

Appendix 1: Areas with Additional Obligations

1.1 Minimum Surface Casing Requirements

Within the listed below, if the ground elevation is less than 564.0 m, a well must have surface casing set 137 m below surface; if the ground elevation is greater than 564.0 m, a well must have surface casing set 107 m below surface.

Portion	Section	Township	Range	Meridian
All	All	50	22	3
All	All	50	23	3
All	All	50	24	3
All	All	50	25	3
All	All	50	26	3
All	All	51	22	3
All	All	51	23	3
All	All	51	24	3
All	All	51	25	3
All	All	51	26	3
All	All	52	22	3
All	All	52	23	3
All	All	52	24	3
All	All	52	25	3
All	All	52	26	3

1.2 Potable Water Sands Requirements

Within the lands listed below, a minimum 9.0 m length of conductor pipe must be set to protect the potable water sands.

Portion	Section	Township	Range	Meridian
SW	30	5	33	1

1.3 Ground Water Precaution Areas

Within the lands listed below, conductor pipe must be used. The use of sump equipment is not permitted, nor is land spraying while drilling.

Portion	Section	Township	Range	Meridian
ALL	34, 35	6	15	2

1.4 Perched Aquifer Area

Within the lands listed below, perched aquifers occur above the regional water table and necessary precautions must be made to prevent contamination. As a minimum, conductor pipe must be used. The use of sump equipment is not permitted, nor is land spraying while drilling.

Portion	Section	Township	Range	Meridian
NE	35	7	5	2
NW	36	7	5	2
SE, SW, LSD 11, LSD 12	2	8	5	2
NE, NW, LSD 7, LSD 8	3	8	5	2
NE, NW, LSD 5, LSD 6	4	8	5	2
NE, NW, SE, LSD 5, LSD 6	5	8	5	2
NE, NW	6	8	5	2
NE, SE, SW	7	8	5	2
ALL	8	8	5	2
ALL	9	8	5	2
NW, SW LSD 2, LSD 7	10	8	5	2
ALL	16	8	5	2
ALL	17	8	5	2
SE	19	8	5	2
SE, SW	20	8	5	2
NE, NW	1	8	6	2
NE, NW	10	8	6	2
ALL	11	8	6	2
ALL	12	8	6	2
SE, SW	13	8	6	2
NE, SE, SW LSD 11, LSD 12	14	8	6	2
NW, SE, SW, LSD 9, LSD 10	15	8	6	2
NE, NW, LSD 7, LSD 8	16	8	6	2
LSD 15, LSD 16	17	8	6	2
LSD 1, LSD 8, LSD 9, LSD 16	19	8	6	2
ALL	20	8	6	2
ALL	21	8	6	2

Portion	Section	Township	Range	Meridian
NW, SW	22	8	6	2
SE, LSD 3, LSD 4	27	8	6	2
SE, SW LSD 9, LSD 10, LSD 11, LSD 12	28	8	6	2
All	29	8	6	2
SE, LSD 3, LSD 4	30	8	6	2
SW, LSD 11, LSD 12, LSD 13	32	8	6	2
NE, LSD 1, LSD 8	31	8	6	2
NW, SW	5	9	6	2
NW, SE, LSD 3, LSD 6	6	9	6	2