



March 23, 2018

6460-4520-59240-09

Kelsey Whiting-Hewlett, C.E.T.
Engineering Technologist
Pengrowth Energy Corporation
2100, 222 – 3rd Ave S.W.
Calgary, AB T2P 0B4

Dear Mr. Whiting-Hewlett:

**RE: PRESSURE MAINTENANCE WATERFLOOD SPECIAL PROJECT – AMENDMENT #4
OTHER THAN NORMAL SPACING ORDER – AMENDMENT #4
OAK FIELD – CECIL “C” POOL**

The Commission has reviewed the email request, dated January 15th, 2018, to increase the MWHIP for well Pengrowth et al Oak 13-35-85-18 (WA # 9415) from 8,400 kPa to 11,350 kPa.

The well Oak 13-35 MWHIP was reduced as a condition of Order 00-09-005 Amendment #3, due to a re-occurring SCVF, to a value based on a hydraulic column to below the base of defined usable water. Pengrowth has identified the Spirit River interval of potential leakage and isolated with a straddle packer. Further, Pengrowth has provided verification that an increase in MWHIP did not correlate to an increase in SCVF.

The following Orders are attached;

- 1) Order 00-09-005 Amendment #4 designating Pressure Maintenance Waterflood within the Oak field – Cecil “C” pool, as a Special Project under section 75 of the *Oil and Gas Activities Act*, and
- 2) Order 00-09-005 OTN - Amendment #4 approving Other Than Normal Spacing under section 65.1 of the *Petroleum and Natural Gas Act* for the subject area and formation.

The MWHIP for well 13-35 is increased to 11,350 kPa, conditional upon increased SCVF monitoring frequency on the surrounding wells, listed in Appendix “A”. Please contact Linan Zhang at (250) 980-6068 for modified SCVF test procedure.

This amended approval includes maximum wellhead injection pressures (MWHIP), an ultimate pool pressure limit, restriction of injection to the purpose of oil recovery, reporting of injection water source, and a revised submission date for the annual progress report.

Please note that, as per section 75 of the *Drilling and Production Regulation*, a record of the volume of water injected must be included on a Monthly Injection or Disposal Statement (BC-S18), which must be submitted to the Commission no later than the 25th day of the following month.

Should you have any questions, please contact Petra Kriescher-Trudgeon at (250) 419-4415 or the undersigned at (250) 419-4430.

Sincerely,

Ron Stefik, Eng.L.
Supervisor, Reservoir Engineering
Oil and Gas Commission

Attachments

ORDER 00-09-005 Amendment #4


- 1 Under section 75(1)(a) of the *Oil and Gas Activities Act*, the Oak field – Cecil “C” pool is designated as a Special Project for the recovery of oil utilizing pressure maintenance waterflood within the following area;

DLS Twp 85 Rge 18 - NW/4 Sec 26, Sec 27, Sec 34 and Sec 35

Twp 86 Rge 18 - Sec 2, Sec 3, SE/4 Sec 10, Sec 11, Sec 12, W/2 Sec 13 and Sec 14.

- 2 Under section 75(2) of the *Oil and Gas Activities Act*, I specify the following:

- a) The oil production allowable for a month shall be based on the previous month’s voidage replacement.
- b) All associated produced gas must be conserved.
- c) Water may be injected into the wells 13-35-085-18 (WA # 9415), 07-03-86-18 (WA # 7963) and 16-02-86-18 (WA # 15150).
- d) Inject only through tubing with a packer set as near as is practical above the injection interval.
- e) Not exceed an injection pressure, measured at the wellhead, of
 - i. 11,300 kPa for well 13-35-085-18, and
 - ii. 16,400 kPa for wells 07-03-086-18 and 16-02-086-18, or
 - iii. the pressure required to fracture the formation, whichever is lesser.
- f) Not exceed an average pool pressure of 11,460 kPa measured at 553 mSS.
- g) For wells listed in (c):
 - i. Cease injection and notify the Commission immediately if hydraulic isolation is lost in the wellbore or formation
 - ii. Submit the annual packer isolation test report to the Commission within 30 days of the completion of the test.
 - iii. Include the injection hours and the maximum injection pressure value on the monthly BC-S18 form.
- h) In addition to conditions listed in (g), well 13-35-085-18 requires:
 - i. Conduct annual PIT and SCVF tests and submit the test reports to the OGC within 14 days of completion.
 - ii. Conduct a SCVF test on each of the Pengrowth operated wells within 5 km and submit the test reports to the OGC by July 1, 2018 and annually thereafter.
 - iii. Monitor and report to the Commission immediately any significant SCVF change observed on any of the wells listed in Appendix “A”.
- i) Injection must cease upon termination of production from the pool.
- j) The permit holder must submit a Progress Report to the Commission for each 12 month period the project is in operation, filed by March 31st the following year, and must contain the information specified in Pressure Maintenance Progress Report Requirements.



Ron Stefik, Eng.L.
Supervisor, Reservoir Engineering
Oil and Gas Commission

DATED AT the City of Victoria, in the Province of British Columbia, this 23rd day of March 2018.

Advisory Guidance for Order 00-09-005 Amendment #4

- I. A production packer must be set above the injection interval and the space between the tubing and casing filled with corrosion and frost inhibiting fluids, as per section 16(2) of the Drilling and Production Regulation.
- II. Annual packer isolation tests are required to be submitted, as per section 16(3) of the Drilling and Production Regulation.
- III. Injected fluids must be metered and the injection pressure measured at the wellhead, as per section 74 of the Drilling and Production Regulation.
- IV. A monthly injection statement must be submitted to the Commission not later than the 25th day of the month following the reported month, as per section 75 of the Drilling and Production Regulation.

Appendix “A”: SCVF Testing Requirement

WA	Surface Location	Testing Frequency
12303	Pengrowth et al Oak 5-35-85-18	Monthly
8154	Pengrowth et al Oak 10-34-85-18	Monthly
7963	Pengrowth et al Oak 7-3-86-18	Monthly
20412	Pengrowth et al Oak 6-2-86-18	Monthly
8153	Pengrowth et al Oak 2-2-86-18	Monthly
12405	Pengrowth et al Oak 7-2-86-18	Monthly
15150	Pengrowth et al Oak 16-2-86-18	Monthly
7942	Pengrowth et al Oak A1-10-86-18	Monthly
24873	Pengrowth Oak 8-10-86-18	Monthly
9415	Pengrowth et al Oak 13-35-85-18	Monthly
9526	Pengrowth et al Oak 8-34-85-18	Monthly – access permitting

ORDER 00-09-005 - OTN Amendment #4

- 1 Under Section 65.1(2) of the *Petroleum and Natural Gas Act*, Other Than Normal Spacing is approved within the Oak field – Cecil “C” pool within the following area;
DLS Twp 85 Rge 18 - NW/4 Sec 26, Sec 27, Sec 34 and Sec 35
 Twp 86 Rge 18 - Sec 2, Sec 3, SE/4 Sec 10, Sec 11, Sec 12, W/2 Sec 13 and Sec 14.

- 2 Under section 65.1(3) of the *Petroleum and Natural Gas Act*, I specify the following:
 - a) the target area for an oil well completed within the project area is not nearer than 100 m to the sides of the Other Than Normal Spacing area,
 - b) an oil well completed outside the target area specified in paragraph (a) may be subject to an off-target production penalty,
 - c) oil wells drilled within the specified project area are not subject to spacing requirements.



Ron Stefik, Eng.L.
Supervisor, Reservoir Engineering
Oil and Gas Commission

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