

PRESSURE MAINTENANCE PROJECT PROGRESS REPORT REQUIREMENTS

Operation of a Pressure Maintenance project (waterflood or gas injection) for enhanced oil recovery, as a Special Project under section 75 of the Energy Resource Activities Act, may require submission of Progress Reports to the BC Energy Regulator (Regulator or BCER). The purpose of a Progress Report is to; 1) compel the project owner to review performance and identify operational opportunities, and 2) verify to the Regulator that approved operating conditions are being met and conservation is being achieved. Progress Report content, formerly stipulated by regulation, is referenced within the project approval conditions. This document provides a current common standard for Report content.

A Progress Report to the Regulator covers the previous calendar year 12-month period, unless an alternate reporting period has been approved. For projects that commence injection operation late in the calendar year, the initial reporting period may be stipulated in the approval to commence a year later (an initial reporting period of > 12 months). Progress Reports are normally due March 31st of the following year.

The Progress Report should contain, when applicable:

1. For each producing well, and for the project as a whole;
 - (1) The average daily oil rate, gas-oil and water-oil ratios for each month
 - (2) The monthly and cumulative volume of oil, gas and water production
2. For each injection well, and for the project as a whole;
 - (1) The average daily injection rate for each month
 - (2) The monthly and cumulative volume of fluid injected
 - (3) The monthly average wellhead injection pressure
3. The voidage replacement ratio (VRR), between fluids injected and fluids withdrawn, both monthly and cumulative, from the project, and by individual patterns where applicable. A VRR table showing the data elements used for calculation of the monthly and cumulative VRR (see Appendix A).
4. A summary of any reservoir pressure tests, in table form and posted to well location in pool map view, performed on wells in the project area. An estimate of the current reservoir pressure using a volume weighted average formula.
5. The date and type of any well treatments or workovers. Indicate the date and type of the workover on the injection/production volume data of this report as indicated in items (1) and (2) above.
6. Summary Tables:
 - (1) Identifying the volume and source of the fluid injected i.e. by-product produced water (pool), water source well (well licence number), surface water (water licence number).

- (2) Pre-injection treatment of fluids identified in (1)
- (3) Injection well packer isolation tests conducted with in the project area.
- (4) Any injection well hydraulic isolation and wellbore integrity logging.
- (5) Any surface casing vent flows detected within the project area.

Data filed must be submitted in **graph and table form**, unless the Regulator has authorized in writing the submission of these data in interpretative map or other form.

A central aspect of pressure maintenance progress reporting is the Voidage Replacement Ratio (VRR) indicated in #3). An example VRR table showing the data elements and the voidage replacement calculation is shown in Appendix A.

Mature projects with consistent reporting history and demonstrated effective project management can apply for the reporting period to be amended to biennial (every 2 years), or exempted for submission of further Reports. An application would consist of a request letter to the Supervisor, Reservoir Engineering, indicating the rational for the request and supporting information showing the project's proven track record.

NOTE: For any injection well operating within a pressure maintenance project, a monthly injection statement must be submitted to the Regulator via Petrinex not later than the 20th day of the month following the reported month, as per section 75 of the Drilling and Production Regulation.

Appendix A: Voidage Replacement Table (Year)

Month	Bo	Rs	Bg	Bw	Monthly Oil (m ³)	Monthly Gas (e ³ m ³)	Monthly Water (m ³)	Monthly GOR (m ³ /m ³)	Monthly Water Injected (m ³)	Monthly Gas Injected (e ³ m ³)	Reservoir Volume Produced (m ³)	Reservoir Volume Injected (m ³)	Monthly VRR	Cum VRR since Injection
Jan														
Feb														
Mar														
Apr														
May														
Jun														
Jul														
Aug														
Sep														
Oct														
Nov														
Dec														

It is recommended that the following values be evaluated at reservoir conditions at the average reservoir pressure at the time of the test.

Bo	Oil formation volume factor
Bw	Water formation volume factor
Bg	Gas formation volume factor
Rs	Solution gas-oil ratio

$$\text{VOIDAGE REPLACEMENT RATIO (VRR)} = \frac{\text{injected reservoir volumes}}{\text{produced reservoir volumes}}$$

$$\text{VRR} = \frac{B_w(i_w)}{B_o(q_o) + B_w(q_w) + q_o(GOR - R_s)B_g}$$