Government of Saskatchewan

Submission of Gas Oil Ratio Factor

Guideline PNG034

July 20, 2018

Version 1.0

Governing Legislation:

Act:	*The Oil and Gas Conservation Act*
Regulation:	*The Oil and Gas Conservation Regulations, 2012*
Directive:	*Directive PNG032: Volumetric, Valuation and Infrastructure Reporting in Petrinex*

Record of Change

Version	Date	Description
1.0		Approved Version

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1. Introduction

The Saskatchewan Ministry of Energy and Resources (ER) requires that operators must submit a Gas Oil Ratio (GOR) Factor (m^3 of gas per m^3 of oil) in order to prevent VME0041, VME0010 or VME0042 errors and penalties from being generated in Petrinex for instances when oil production has been reported and there is not enough gas produced to be reported.

1.1 General Information

In some instances Petrinex will generate a VME0041, VME0010 or VME0042 error when there is not enough gas produced to be reported. Therefore new GOR factor functionality has been created in Petrinex to allow operators to submit a well-level GOR Factor or a battery-level GOR Factor to ER. ER will input the factor into Petrinex and Petrinex will determine whether or not a VME0041, VM0042 or VME0010 error should be generated based on the reported oil production within a given production month. The definitions for these three errors are as follows:

- VME0041 – Gas production or gas recovery must be reported when oil production of greater than 15.0 m^3 has been reported at an oil well in a production month. This error applies to the following facility subtypes:
    - 311-Crude Oil Single Well Battery
    - 321-Crude Oil Multiwell Group Battery
    - 322-Crude Oil Multiwell Proration Battery
    - 325-Heavy Crude Oil Single Well Battery
    - 326-Heavy Crude Oil Multiwell Group Battery
    - 327-Heavy Crude Oil Multiwell Proration Battery
    - 344-Thermal In-Situ Battery.
- VME0010 – Gas production or gas recovery must be reported when total oil production greater than or equal to 50.0 m^3 has been reported at a crude oil or heavy crude oil facility in a production month. This error applies to the following facility subtypes:
    - 321-Crude Oil Multiwell Group Battery
    - 322-Crude Oil Multiwell Proration Battery
    - 326-Heavy Crude Oil Multiwell Group Battery
    - 327-Heavy Crude Oil Multiwell Proration Battery
    - 344-Thermal In-Situ Battery.
- VME0042 – Gas production or gas recovery must be reported when oil production greater than or equal to 50.0 m^3 has been reported at an oil well in a production month. This error applies to the following facility subtypes:
    - 311-Crude Oil Single Well Battery
    - 313-Heavy Crude Oil Paper Battery
    - 316-Crude Oil Multiwell Swab Paper Battery.

The remainder of this Guideline provides details on methods to determine the GOR factor; requirements for submitting the GOR factor to ER; and functionality available for industry in Petrinex for notifications, Petrinex screens and reports relating to this new functionality

2. Methods for determining the GOR Factor for a well or battery

Before an operator submits a GOR factor to ER, the operator must conduct a test to determine the GOR factor. Operators are allowed to submit a battery-level GOR factor or a well-level GOR

factor based on the criteria listed below. These requirements are found in *Directive PNG017: Measurement Requirements for Oil and Gas Operations* (*Directive PNG017*). A GOR factor must be updated immediately following any operational changes that could cause the GOR factor to change. Please note that throughout this Guideline the term "well completion ID" is used instead of the term "well event ID". However, both terms refer to the same identifier.

2.1 Methods for determining the GOR Factor for a well completion

Methods for determining the GOR factor for a well completion can be found in *S*ection 4.3.8.5 of *Directive PNG017*

2.2 Methods for determining the GOR Factor for a battery

Methods for determining the GOR factor for a battery can be found in Section 4.3.8.3 of *Directive PNG017.*

3. Requirements for Submitting a GOR Factor

When an operator submits a GOR factor the following information must be filled out in the GOR Factor Application see attachment called "GOR Factor Application". The application must contain:

- A GOR factor in the units m3 of gas per m3 of oil;
- The Well Completion ID (i.e. well event ID) that the GOR factor applies too;
- The battery's Facility ID that the GOR factor applies too;
- A measurement schematic for the facility;
- Type of GOR factor (battery-level or well-level);
- Method used to determine the GOR factor and all applicable supporting documentation; and
- Additional information if a public notice had been conducted.

The GOR Factor Application, Measurement Schematic, Supporting Documentation and if applicable public notices are to be submitted to ER Service Desk at er.servicedesk@gov.sk.ca.

For all operators of multi-well battery (facility subtypes 321, 322, 326, 327 and 344) all well completions within that battery that are active (which includes shut in) must submit GOR factors, otherwise the VME0010 will continue to be generated.

Operators must submit the GOR factor a minimum of 5 business days before the Volumetric Reporting Deadline to ensure that ER has adequate time to review the supporting documentation and enter the information in Petrinex. In cases where the operator submits a GOR factor within 5 business days of the Volumetric Reporting Deadline ER, ER is unable to complete the review before the Volumetric Deadline; ER may not waive any penalty associated with the error.

3.1 Expiration of a GOR Factor

The GOR factor for a facility or well completion must be reviewed yearly as per *Directive PNG017* or if any operations have changed then a new GOR factor must be determined and submitted. The GOR factor will expire 15 months after submission in Petrinex. The GOR factor must be resubmitted to ER with the application and supporting documentation before the

expiration of 15 month period to ensure the errors are waived. Petrinex will notify the operator each month for the five remaining months until the expiration of the GOR factor.

3.2 Approval of GOR Factor

Once a GOR factor and all supporting documentation has been received by ER, ER will review the documentation and if approved the GOR factor will be submitted in Petrinex by ER. Petrinex will then calculate the amount of oil required to be reported as production before a VME0010, VME0041 or VME0042 error will be generated. If the oil production is less than the oil volume that requires gas production to be reported in Petrinex then no error will generate. If the oil production is greater than the oil volume that requires gas production to be reported in Petrinex then the error will generate.

4. GOR Factor Functionality in Petrinex available to Industry

ER in conjunction with Petrinex has developed a screen, notifications and reports in Petrinex to better aid operators.

4.1 Query Gas Oil Ratio Screen

In Petrinex under Well Infrastructure is Query Gas Oil Ratio Screen. This screen allows the operator to review any submitted GOR factors for a well completion.

4.2 Notifications

Three notifications have been implemented in Petrinex to better aid Operators. These notifications were designed to notify operators of the submission of a GOR factor for a well completion ID (i.e. well event ID) and when a GOR factor must be resubmitted.

4.2.1 GOR Factor has Changed

Industry will receive a GOR notification, GOR001 when a GOR has been submitted by ER for a particular well completion. The GOR001 notification will be as follows:

> *Well [well event id] has changed its GOR Factor [GOR Factor] for the period starting on [Start Prod Month] and ending on [End Prod Month]*.

4.2.2 GOR Factor has been backdated

Industry will receive a GOR notification GOR002 when a GOR has been submitted by ER for a particular well completion and the dates for which the GOR Factor applies are for volumetrics that have already been submitted. The GOR002 notification will be as follows:

> *Well [well event id] has changed its GOR Factor [GOR Factor] for the Month starting on [Start Prod Month] and ending on [End Prod Month].*
>
> *Volumetrics must be resubmitted in order to remove existing errors.*

4.2.3 Expiring GOR Factor

Every month industry will receive a notification that lists all the wells that will be expiring in the next five months. See Figure 1 below for the notification screen.

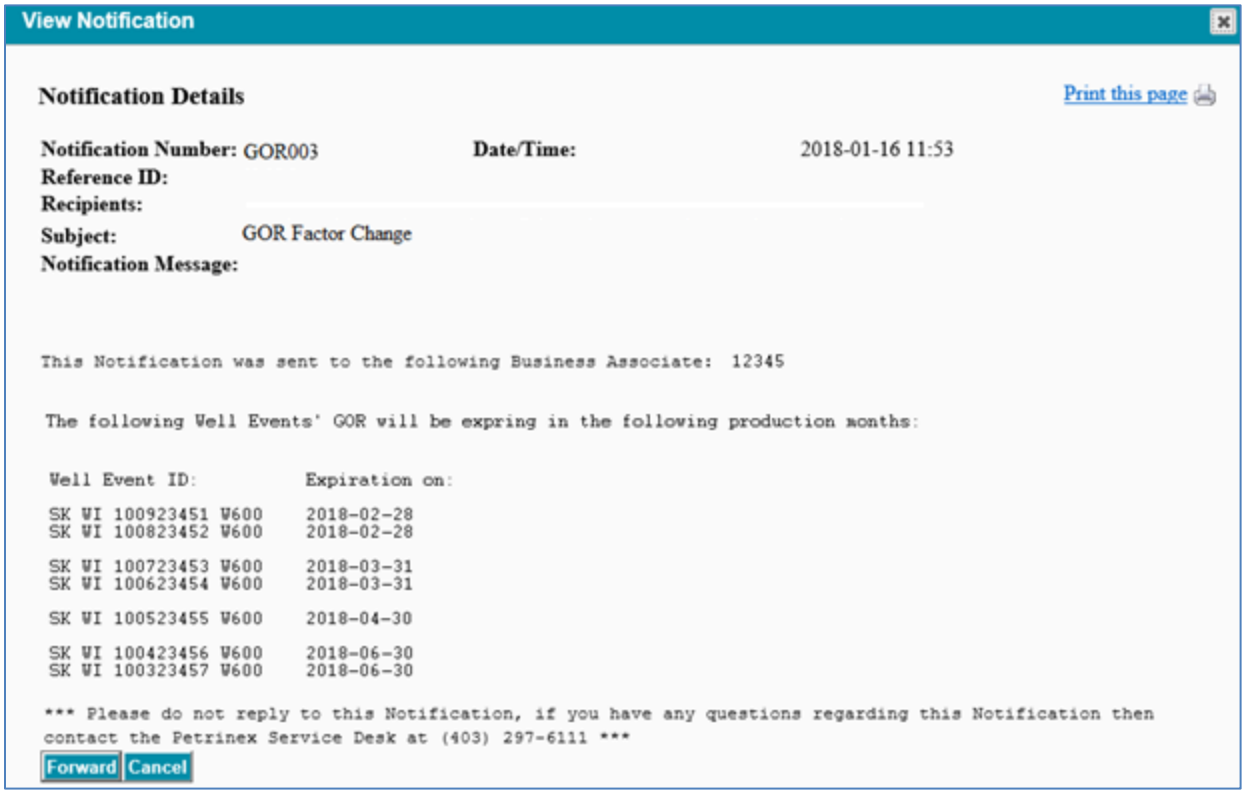


Figure 1: *GOR003 Monthly Notification on expiring GOR Factors*

4.2 Reports

Petrinex has created a Gas Oil Ratio report that can be run by industry. This report provides information on all the submitted GOR factors and which GOR factors are about to expire. The report is available under Submit Report Request. See Figures 2 and 3 below for selection screen and report details.

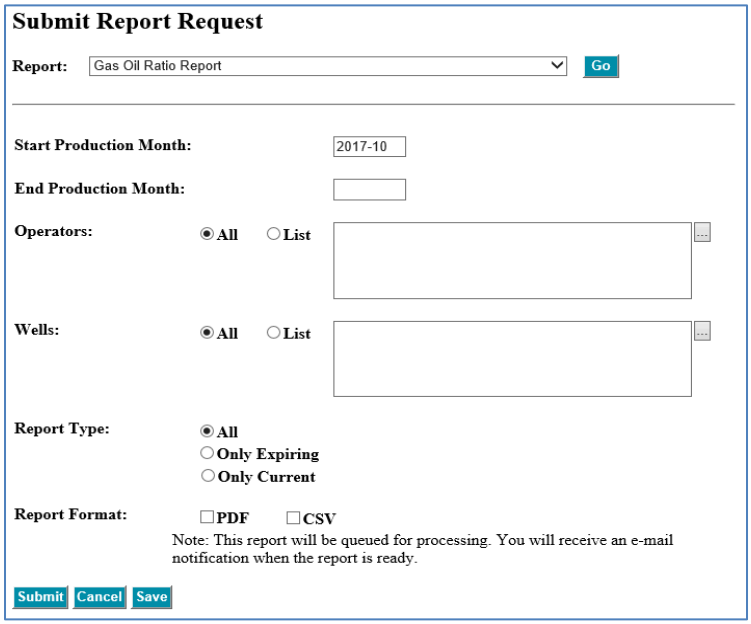
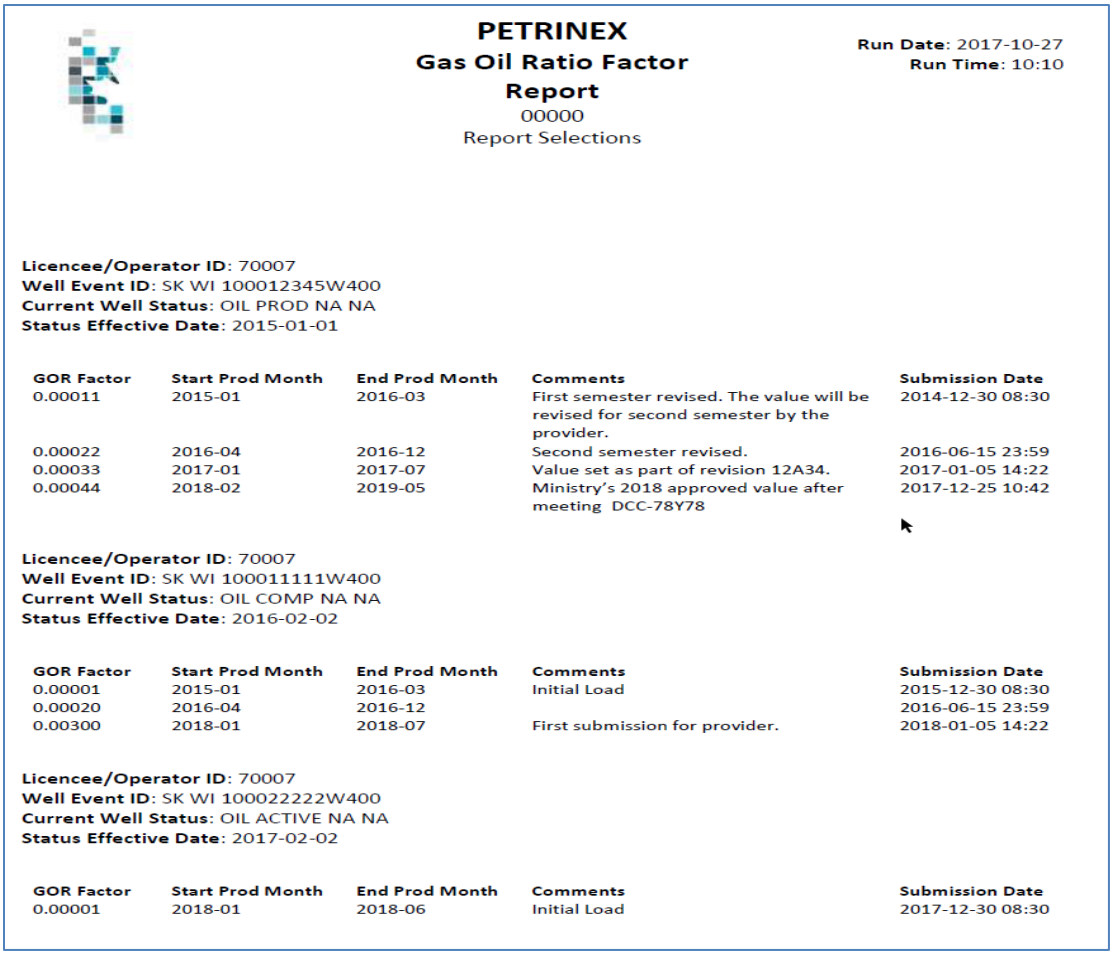


Figure 2: *Gas Oil Ratio Report Selection Screen*



PETRINEX
Gas Oil Ratio Factor Report
00000
Report Selections

Run Date: 2017-10-27
Run Time: 10:10

Licencee/Operator ID: 70007
Well Event ID: SK WI 100012345W400
Current Well Status: OIL PROD NA NA
Status Effective Date: 2015-01-01

GOR Factor	Start Prod Month	End Prod Month	Comments	Submission Date
0.00011	2015-01	2016-03	First semester revised. The value will be revised for second semester by the provider.	2014-12-30 08:30
0.00022	2016-04	2016-12	Second semester revised.	2016-06-15 23:59
0.00033	2017-01	2017-07	Value set as part of revision 12A34.	2017-01-05 14:22
0.00044	2018-02	2019-05	Ministry's 2018 approved value after meeting DCC-78Y78	2017-12-25 10:42

Licencee/Operator ID: 70007
Well Event ID: SK WI 100011111W400
Current Well Status: OIL COMP NA NA
Status Effective Date: 2016-02-02

GOR Factor	Start Prod Month	End Prod Month	Comments	Submission Date
0.00001	2015-01	2016-03	Initial Load	2015-12-30 08:30
0.00020	2016-04	2016-12		2016-06-15 23:59
0.00300	2018-01	2018-07	First submission for provider.	2018-01-05 14:22

Licencee/Operator ID: 70007
Well Event ID: SK WI 100022222W400
Current Well Status: OIL ACTIVE NA NA
Status Effective Date: 2017-02-02

GOR Factor	Start Prod Month	End Prod Month	Comments	Submission Date
0.00001	2018-01	2018-06	Initial Load	2017-12-30 08:30

Figure 3: *Gas Oil Ratio Factor Report Details*