Government of Saskatchewan

Measurement, Accounting and Reporting Plan for Thermal Heavy Oil Recovery Projects

Guideline PNG042

May 1, 2018

Version 1.4

Governing Legislation:

Act: The Oil and Gas Conservation Act

Regulation: The Oil and Gas Conservation Regulations, 2012

Record of Change

Version	Date	Description
0.0		Initial draft.
1.0	November 1, 2015	Approved first version.
1.1	April 1, 2016	Updated the requirements for existing thermal EOR projects.
1.2	September 1, 2016	Updated the requirements for a well list to be included in the document.
1.3	August 1, 2017	Updated Section 2.1. No longer required to include the EOR Application number because the application number is not generated till after the EOR application is submitted on IRIS. Updated Section 2.3 requiring operators to provide details on primary and secondary measurement.
1.4	June 19, 2018	Changed the Ministry of the Economy name to Ministry of Energy and Resources. Changed the requirement for when the MARP must be submitted.

Contents

1. Introduction

The Saskatchewan Ministry of Energy and Resources (ER) has upgraded the requirements for Thermal Heavy Oil Recovery (EOR) projects. As of November 1, 2015, in addition to the Enhanced Oil Recovery application requirements, a measurement, accounting and reporting plan (MARP) must be submitted for these types of projects. This guideline explains what the MARP must contain.

Effective May 1, 2018 applicants are no longer required to submit their Measurement, Accounting and Reporting Plan (MARP) with their application for a Thermal Heavy Oil Recovery Project. An approved MARP must be in place prior to injection or production in a Thermal Heavy Oil Recovery Project. The MARP application can be emailed directly to the Measurement Committee at directive17.er@gov.sk.ca until such time that a new application type has been created to be submitted in IRIS.

A MARP submission will be required if the licensee changes an existing project, including new or additional wells, and/or surface facilities.

For existing projects, without an approved MARP, ER will not require the submission of a MARP if the project is not adding new or additional wells and/or surface facilities.

If the Thermal Heavy Oil Recovery (EOR) project already has an approved MARP and is adding new or additional wells and/or surface facilities or the scope of the project is changing a new MARP may be require depending on the following requirements:

- A new MARP must be submitted if the licensee is changing the measurement, accounting and reporting methodology that was originally approved in the MARP; or

- A new MARP will not be required when the licensee incorporates the same production, operating, measurement, and accounting processes approved under the original MARP.

This application process has been put into place to improve compliance and will allow applicants and licensees to work together to identify potential problems.

2. MARP Submission

Licensees are now required to submit the following information regarding measurement, accounting and reporting that includes water balancing. For some items, a statement that the licensee will meet the requirements of related documents may be sufficient.

2.1 General Project Information

- Full company name and Business Associate Identifier (BA ID)
- Project name and number
- Company contact(s)
- General project/process description and location

2.2 Process and Measurement Diagram

A simplified process flow or block and accounting measurement diagram(s) for the proposed project showing the following information:

- All surface facilities associated with the project, including surface locations, Petrinex facility subtypes (if applicable), facility licence numbers (if applicable), process equipment such as crude oil treating and upgrading, proration testing, water treatment, steam generation, cogeneration, waste handling, and disposal;
- A list of all wells associated with the project, indicating how each well will tie into the surface facilities; include and identify crude oil wells, steam/solvent/ gas/water injection and disposal wells, water source wells and observation wells;
- All applicable receipt points, whether by truck or pipeline; indicate what fluids will be received (e.g., gas, condensate, etc), the source of the fluids if known (e.g., reporting facility code);
- All applicable disposition points, whether by truck or pipeline; indicate what fluids will be disposed (e.g., water) and the destination of the fluids (e.g., reporting facility ID);
- All applicable flow lines, fuel lines, flare lines, recycle lines, skim lines, gas-lift lines, solvent injection lines, and utility lines;
- All applicable crude oil, emulsion, condensate and water tanks/storage ponds/vessels, with the dimensions and capacity of each; and
- All applicable measurement devices (e.g., meters, gauges, product analyzers), measurement points, and sample points:
    - Label and indicate the type of measurement device(s),
    - Provide a table showing maximum uncertainty of measurement devices,
    - If electronic flow measurement (EFM) is used, indicate where measurement devices are configured with EFM; and
- Boundaries of applicable production facilities, such as batteries and injection facilities, that report to Petrinex, with the appropriate facility subtype codes.

2.3 Description of Proposed Operating Procedures

- **Calibration and Proving** – For each measurement device used for accounting and ER reporting purposes, outline the frequency and method of calibration, checking, or proving.
- **Gauging** – Outline the method of gauging tanks/storage ponds/vessels and the frequency of calibrating applicable gauging devices.
- **Trucking** – Outline the method(s) of measuring, sampling, and recording production moved by truck to or from the facilities associated with the scheme.
- **Sediments and Water (S&W) Procedures** – Outline the frequency and method of determining the water cut of proration test production.
- **Valid Test Criteria** – Provide the criteria for accepting or rejecting proration tests.
- **Load Fluid Recovery** – Outline the method used to determine well production rates during load fluid recovery.

- **Common Flow Lines** – Outline the proration test procedure and purge time for wells on common flow lines.
- **Field Headers** – Outline the proration test procedure and purge time for wells producing to field headers. Provide test line capacity and test and group operating line pressures.
- **Casing Head Gas** – List wells using casing head gas and/or produced gas for fuel.
- **Gas Lift** – List the wells using gas lift.
- **Primary and Secondary Measurement** – Provide detail on how primary and secondary Measurement will be performed at the facility.

2.4 Accounting Calculations and Reporting

- **Estimated Production Worksheet** – For proration batteries that make up the thermal heavy oil project, provide a sample worksheet for determining the estimated crude oil, gas, and water production for each well.
- **Accounting Formulas** – For each production facility reporting to Petrinex, provide the calculations and cite the applicable measurement points used to determine the following:
  - Crude oil production, disposition(s), and inventories.
  - Gas production, disposition(s), and receipts.
  - Water production, disposition(s), receipts, and inventories.
  - Water source production, disposition, receipts, and inventories; include copies of the most recent water analysis for all water wells and sources.
  - Condensate, solvent, and non-condensable gases receipts, injection, disposition, and inventories.
  - Total fuel, flare, and vented gas.
- **Outline the methods used to:**
  - Calculate/estimate the volume of water vapour in the metered gas streams and procedures used to adjust metered gas volumes for gas streams operating at a temperature greater than 100 degrees Celsius (corrected to 101.325 kilopascals absolute).
  - Determine shrinkage when blending hydrocarbon liquids with densities differing more than 40.0 kilograms per cubic metre.
  - Determine shrinkage when condensate (diluent) is flashed through heavy crude oil treating and other process equipment.
  - Estimate unmetered flare, fuel, vented, and other gas streams; include sample calculations showing all particulars.
  - Estimate gas in solution with oil dumped to stock tanks and with crude oil at proration test conditions.
  - Determine recovery of injected solvent and non-condensable gases distinct from heavy crude oil and solution gas production.
- **Other** – Describe any other estimate, correction, or adjustment procedures used to calculate volumes.

2.5 EOR Application Approval Process