STATUTORY INSTRUMENTS
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STATUTORY INSTRUMENTS SUPPLEMENT

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S T A T U T O R Y I N S T R U M E N T S

2016 No. 45.

THE PETROLEUM (EXPLORATION, DEVELOPMENT AND PRODUCTION) (METERING) REGULATIONS, 2016

ARRANGEMENT OF REGULATIONS

Regulation

S T A T U T O R Y I N S T R U M E N T S

2016 No. 45.

The Petroleum (Exploration, Development and Production) (Metering) Regulations, 2016.

(Under sections 110, 183 (3) (o) and (s) of the Petroleum (Exploration, Development and Production) Act, 2013, Act 3 of 2013).

IN EXERCISE of the powers conferred upon the Minister responsible for petroleum activities by section 183 of the Petroleum (Exploration, Development and Production) Act, 2013, these Regulations are made this 6th day of May, 2016.

PART I—PRELIMINARY

1. Title.

These Regulations may be cited as the Petroleum (Exploration, Development and Production) (Metering) Regulations, 2016.

2. Application.

These Regulations apply to metering of petroleum in petroleum activities.

3. Purpose of Regulations.

The purpose of these Regulations is—

(a) to ensure that accurate metering forms the basis of custody transfer of petroleum, the calculation of taxes, royalties and fees due to the Government and income of the licensees;

(b) to provide for metering for purposes of reservoir management;

(c) to define functional and specific requirements relating to the design and operation of the metering equipment;

(d) to provide for the responsibility of a licensee to ensure that the metering equipment and method at all times comply with these Regulations;

(e) to stipulate requirements for reporting and documentation of crude oil, gas, flare gas and other fluids; and

(f) to provide for suitable supervision and monitoring of metering activities.

4. Interpretation.

In these Regulations, unless the context otherwise requires—

"Act" means the Petroleum (Exploration, Development and Production) Act, 2013;

"Authority" means the Petroleum Authority of Uganda established by section 9 of the Act;

"authorised officer" means an officer or other person acting under the authority of the Minister or the Authority under the Act and these Regulations;

"allocation" means breaking down quantities of produced petroleum across various contributing sources;

"best petroleum industry practices" means the use of what is accepted to be the best available practices that are generally accepted as good, safe, transparent and efficient in carrying out petroleum activities and that can be applied globally under similar circumstances;

"calibration" means the establishment of the relationship between measured value and reference value with known uncertainty;

"calibration factor" or "K-factor" means the relationship between the measured value coming from a meter and the measured value from a reference measurement system;

"computer part" means the part of the metering system which consists of computers and receives metering signals from digital instrument loops;

"currency point" has the value assigned to a currency point in Schedule 1;

"custody transfer" means the transfer of ownership or possession of petroleum from one party to another;

"fiscal metering" means metering or measurement of petroleum carried out in connection with purchase and sale and the calculation of taxes and royalties;

"instrument part" means that part of the metering system which includes the instrument that responds to the digital input of the computer part;

"licence" means a licence issued under the Act;

"licensee" means a person to whom a licence is granted under the Act;

"measurement uncertainty" means an expression of the result of a measured value which characterises the range within which the true value is expected to lie;

"mechanical part" means all mechanical equipment included in a petroleum metering system;

"metering system" means the combination of the mechanical part, an instrument part and a computer part, and associated connecting loops comprised in the equipment for metering and measurement of petroleum;

"metering station" means an assembly of metering equipment dedicated to the determination of measured quantities of petroleum at a given location;

"place of manufacture" means a place where fabrication, assembly and testing of one or more of the metering system's main components takes place;

"place of operation" means a facility or terminal where the metering system is in service;

"prover" means a device for calibration of dynamic flow meter, based on displacement of a body through a calibrated tube;

"standards" means standards, specifications, and codes of practice which apply to the construction, operation, use, decommissioning and disposal of facilities required for the purpose of carrying out petroleum activities including standards for emission, company standards, compulsory standards specifications, internal standards, approved by the Authority or standards issued under the National Bureau of Standards Act and best petroleum industry practices;

"standard test apparatus" means equipment or apparatus whose measurement result meets the required objective for which the measurement is made and it's accuracy or uncertainty is traceable to standards approved by the Authority and best petroleum industry practices;

"verification" means reviewing, inspecting or testing equipment, product, service or system to establish compliance with these Regulations, standards approved by the Authority and best petroleum industry practices.

PART II—GENERAL REQUIREMENTS

5. Requirement for management control system.

(1) Every licensee shall establish a management control system for metering and measurement of petroleum which shall include organisation, processes, procedures and resources necessary to ensure compliance with the Act and these Regulations.

(2) The management control system referred to in subregulation (1) shall be maintained by the licensee in a systematic and controlled manner and its update and revision shall be communicated to the Authority and any other relevant agency.

(3) The management control system shall ensure that relevant experience and information is conveyed from the construction phase to the operational phase and from one shift of personnel to the next.

(4) Every licensee shall prepare a quality assurance manual for the operation of the metering systems.

6. Organisation and competence.

(1) Every licensee shall appoint a person-in-charge of the metering system to ensure that procedures relating to operation, maintenance, calibration, verification and control are followed.

(2) A licensee shall document the functional scope and areas of responsibility of the personnel who carry out tasks in connection with the metering system and shall describe the duties, responsibilities and authority of the personnel.

(3) All personnel carrying out tasks related to the metering systems shall possess documented qualifications within the relevant technical field and the licensee shall establish a system to ensure skills or competence advancement.

7. Requirement for use of standards approved by the Authority and best petroleum industry practices.

Metering activities shall be carried out in accordance with the requirements prescribed under these Regulations, standards approved by the Authority and best petroleum industry practices.

8. Metering and measurement of petroleum.

(1) A licensee shall meter and analyse petroleum produced, including petroleum that has been sold, in accordance with these Regulations, standards approved by the Authority, best petroleum industry practices and guidelines issued by the Authority.

(2) The equipment and procedures for metering shall meet standards approved by the Authority and best petroleum industry practices.

(3) Where the Authority establishes that the volume of petroleum produced or sold has been incorrectly calculated, the licensee shall investigate the matter and produce documentation that shall form the basis for determining the correct volume immediately, but in any case not later than fourteen days from the date of the establishment.

(4) The Authority may issue further directions relating to the correct volume referred to in subregulation (3).

(5) The licensee shall, with volume and gravity correction to 60 °F and by a method or methods approved by the Authority in writing, measure—

(a) all petroleum won and saved and casing-head petroleum spirit recovered from the licence area; and

(b) all natural gas sold.

(6) The Authority or an authorised officer shall have unlimited access to the metering stations and the control room at all times.

(7) The Authority or an authorised officer shall at all times be present when an equipment or appliance for metering petroleum is being calibrated, re-calibrated, tested, verified, compared or measured to ensure that the equipment or appliance is in accordance with standards approved by the Authority, best petroleum industry practices accepted methods and procedures agreed to by the Authority.

(8) Where any fiscal meter or fiscal metering appliance is at any time found to be false or inaccurate—

(a) the appliance shall be deemed to have existed in that condition during the period of three months prior to the discovery unless the licensee can prove to the satisfaction of the Authority that the error could not have possibly occurred over that period or the period that has elapsed since the last occasion upon which the appliance was examined or tested, whichever is less; and

(b) the royalties and other entitlements including profit oil, bonuses payable in respect of the period during which the appliance is deemed existed shall be adjusted accordingly.

(9) The licensee shall not repair, maintain, or make any alterations to an approved metering or measuring equipment or appliances or in the method or methods of metering without the written approval of the Authority.

(10) An authorised officer shall be present during repairs, maintenance or alterations.

(11) The frequency at which metering equipment or appliances are calibrated or tested shall be in accordance with the recommendation of the manufacturer and shall meet standards approved by the Authority, best petroleum industry practices and guidelines issued by the Authority.

(12) The Authority shall have the right to test and establish the accuracy of fiscal metering appliances or equipment at any time without previous notice to the licensee.

9. Standard test apparatus.

(1) The licensee shall use standard apparatus for determining the physical properties of petroleum.

(2) The apparatus referred to in subregulation (1) shall be engraved with the words "Standard Test Apparatus" and shall be verified and corrected by the licensee from time to time and replaced when necessary, in accordance with these Regulations, and with the approval by the Authority.

General Requirements Relating to Metering and Metering Systems

10. Allowable metering uncertainty.

(1) The allowable metering uncertainty shall be in accordance with Schedule 2, standards approved by the Authority and best petroleum industry practices.

(2) The metering system shall be designed so that metering errors are avoided or compensated for.

(3) A licensee shall document the total uncertainty of the metering system and prepare an uncertainty analysis for the metering that gives a confidence level of 95 percent or higher.

(4) Liquefied natural gas shall be measured and analysed at the place of loading in the presence of an authorised officer and the licensee is responsible for, and shall document that the metering system is done in accordance with standards approved by the Authority and best petroleum industry practices.

(5) A licensee may determine liquefied natural gas volumes in connection with loading by use of traceable measured vessel tanks and calibrated level gauges or any other method approved by the Authority.

(6) The allowable uncertainty in respect of individual components of the metering system shall meet standards approved by the Authority and best petroleum industry practices.

(7) The licensee may use linearity band as a test criterion when accepting meters.

(8) The repeatability requirement shall meet standards approved by the Authority and best petroleum industry practices.

11. Units of metering.

(1) The metering system shall give readings in oil field units determined by the Authority.

(2) Reporting of fiscal figures to the Authority shall be in oilfield units determined by the Authority in subregulation (1).

12. Reference conditions.

The standard reference conditions for pressure and temperature during the metering of petroleum shall be standard atmospheric pressure and 60%F.

13. Determination of energy content.

(1) The licensee shall use gas composition from continuous flow proportional gas chromatography or from automatic flow proportional sampling for determining energy content.

(2) The licensee shall ensure that sales gas metering stations have redundancy.

(3) The licensee shall ensure that petroleum is analysed by a competent laboratory to determine the physical or chemical properties and the analysis results, provided the analysis is required for sale or allocation purposes.

(4) The analysis shall be carried out by a competent laboratory approved by the Authority.

(5) In determining barrels of oil equivalent for gas, a conversion factor of 5.8 million BTU per barrel shall be used except as otherwise determined by the Authority.

14. Prohibition against bypassing metering system.

A person shall not bypass the metering system.

Requirements for Design of Metering System

15. General requirements.

(1) The metering system shall be designed in accordance with standards approved by the Authority and best petroleum industry practices so that it is capable of metering the full range of planned petroleum flows without any component operating outside its working range.

(2) The metering system shall, to the extent possible, be equipped with duplicated instrument functions for signals from primary meters and instrumentation for facilitating condition based monitoring and reducing the need for preventive maintenance.

(3) Signals from parallel metering runs shall be used in connection with condition monitoring.

(4) Wireless communication between different parts of the fiscal metering system may be used if it is demonstrated to the satisfaction of the Authority that the solutions are equal to or better than the traditional solution using a communication cable, with regard to metering system integrity.

(5) On sales metering stations, the number of parallel meter runs shall ensure that the maximum flow of petroleum can be measured with one meter run out of service, while the rest of the meter runs operate within their specified operating range.

(6) The metering system shall be suitable for the relevant type of metering, the petroleum properties and the petroleum volumes to be measured.

(7) The metering system shall be installed in accordance with standards approved by the Authority and best petroleum industry practices and flow straighteners or conditioners shall be installed, where necessary.

(8) In areas where inspection and calibration takes place, there shall be adequate protection against outside climate, vibration or any other disruptive condition.

(9) A licensee shall ensure that the metering tube and associated equipment are insulated upstream and downstream for a distance sufficient to prevent temperature changes affecting the instruments that provide input signals for the fiscal calculations.

(10) Shutoff valves shall be of the block and bleed type and all valves of the metering station shall be accessible for inspection to secure against leakage.

(11) All parts of the metering system shall be easily accessible for maintenance, inspection, verification and calibration.

16. Multiphase metering.

(1) Multiphase meters shall not be used for fiscal metering.

(2) Notwithstanding subregulation (1), the Authority may, in exceptional circumstances where traditional single phase metering of petroleum is not possible approve the use of multiphase meters for fiscal metering.

(3) The following elements shall be satisfactorily documented by the licensee to allow use of multiphase metering—

(a) the description of the main principles of the operations and maintenance philosophy;

(b) the possibility to calibrate meters against test separator or other reference;

(c) redundancy in sensors and robustness in the design of the metering concept;

(d) relevant pressure volume and temperature model and representative sampling opportunity to be able to perform a sound pressure volume and temperature model (PVT) calculation;

(e) design of inlet pipes to ensure similar conditions if multiple meters are used in parallel;

(f) flexibility in the system for handling varying gas volume fraction (gvf);

(g) a description of the planned method for condition monitoring and planned calibration interval;

(h) a description of the planned method and interval for sampling and updating (pvt) data; and

(i) any other information that the Authority may require.

(4) Where multiphase meters are part of the fiscal metering system, they shall be treated as other fiscal metering equipment and shall be in accordance with these Regulations, standards approved by the Authority, guidelines issues by the Authority and best petroleum industry practices.

17. Design of mechanical part of metering system.

(1) A licensee shall ensure that—

(a) the mechanical part of the metering system is designed to meet standards approved by the Authority and best petroleum industry practices;

(b) during design, provision is made for necessary redundancy and the possibility of verification of the gas and liquid metering devices;

(c) when turbine meters are used for liquid metering, permanent prover is available for calibration of the metering devices and it is possible to calibrate the prover at the place of operation; and

(d) where other types of flow meters are used for liquid metering, permanent equipment for calibration of the metering device are available.

(2) A licensee shall ensure that surrounding equipment do not affect the measured signals.

18. The instrument part of the metering system.

A licensee shall ensure that the metering system instrumentation is able to measure pressure, temperature, density and composition of petroleum to ensure representative input signals for the fiscal calculations.

19. The computer part of fiscal metering system.

A licensee shall ensure that—

(a) the computer part of fiscal metering system is designed to ensure that fiscal calculations can be carried out within the stipulated uncertainty range;

(b) the computer part of fiscal metering system is equipped with various security functions to ensure that the fiscal values cannot be changed as a result of incidents of a technical nature or as a result of a manual fault;

(c) the pressure and temperature gauges are calibrated regularly in accordance with recommendations of the manufacturer, standards approved by the Authority, best petroleum industry practices and guidelines issued by the Authority, and the calibration results are entered into the flow computer in the presence of an authorised officer;

(d) with regard to reports, the computer part is capable of documenting the various fiscal parameters and the fiscal volumes calculated;

(e) the computer part of a fiscal metering system has uninterruptible power supply;

(f) faults are detected as an alarm and that a back-up system can be activated immediately; and

(g) power failure does not cause deletion of measured fiscal data from the storing unit of the computer part of the metering system.

PART III—START-UP OF THE METERING SYSTEM

20. Requirement for approval.

(1) A licensee shall obtain approval from the Authority prior to start-up of the metering system.

(2) A licensee shall not carryout modification or change in the purpose for use of the metering system without the approval of the Authority.

(3) Where the basis for the approvals under this regulation is significantly changed, the Authority may require the licensee to obtain a new approval before the activities are continued.

(4) Prior to start-up of the metering system, a licensee shall prepare procedures for operation, maintenance, calibration and verification and the procedures shall ensure that the metering system is maintained to the standard to which it is designed, standards approved by the Authority and best petroleum industry practices.

(5) The licensee shall forward to the Authority for approval procedures for calibrations and verifications of metering stations for start-up.

21. General requirement for start-up of metering system.

(1) Calibrations and verifications as described in these Regulations shall be carried out by the licensee prior to start-up of the metering system at the place of operation.

(2) An authorised officer shall be present at the start-up of the metering system.

22. Calibration of mechanical part.

(1) A licensee shall ensure that—

(a) prover volume is calibrated—

(i) before the metering system is delivered from the place of manufacture; and

(ii) prior to start-up at the place of operation;

(b) the mechanical parts critical to metering uncertainty is measured or subjected to flow calibration in order to document calibration curve; and

(c) the fully assembled fluid metering system is flow tested at the place of manufacture and a functional test is performed on flowmeters before start-up of operations.

(2) Except with the approval of the Authority, the licensee shall use statistical methods to provide documentation for repeatability requirements.

23. Calibration of instrument part.

A licensee shall ensure that—

(a) prior to start-up, the instrument loops are calibrated and the calibration results are made available to the Authority;

(b) the instrument loops are calibrated at a number of values necessary to detect any non-linearity errors within its working range; and

(c) calibration of the instrument loops is carried out using the display reading of the visual signal from the computer part.

24. Verification of computer part.

(1) A licensee shall ensure that—

(a) verification of the computer part is carried out for each metering tube to confirm that all functions are operational prior to start-up; and

(b) each independent program routine is verified to show that calculations are carried out with requirements equal to or better than those prescribed in regulation10 and integration is verified with at least three values in the flow range.

(2) The calculations for calibrations as prescribed in regulation 10 shall be verified and shall include K-factor in respect of the individual calibration and the average value within the predetermined range of variation to ensure that they meet the requirements of these Regulations, standards approved by the Authority and best petroleum industry practices.

25. Operation and maintenance of metering systems.
A licensee shall ensure that—

(a) a metering system is operated and maintained to the standard to which it is designed, standards approved by the Authority and best petroleum industry practices;

(b) the equipment that forms an integral part of the metering system, and which is of significant importance to the metering uncertainty, is calibrated using traceable equipment before start of operation, and subsequently maintained to that standard;

(c) where the equipment is found to be outside the given limit values during calibration, correction is carried out by qualified personnel and associated correction is made in accordance with these Regulations, the recommendations of the manufacturer, guidelines issued by the Authority, standards approved by the Authority and best petroleum industry practices; and

(d) traceable calibration of test instruments are carried out regularly by a competent laboratory in accordance with the recommendations of the manufacturer, guidelines issued by the Authority, standards approved by the Authority and best petroleum industry practices.

26. Calibration of prover volume.
A licensee shall ensure that meter prover volume is calibrated at least annually and where the volume may have changed as a result of equipment failure.

27. Operating requirements for flow meters.
A licensee shall ensure that—

(a) where turbine meters are used for metering of petroleum, they are calibrated against the permanent meter prover with a repeatability that conforms with the manufacturer's recommendation; standards approved by the Authority and best petroleum industry practices;

(b) the calibration factor for the flow meters are within the control limits according to the recommendation of the manufacturer standards approved by the Authority, guidelines issued by the Authority and best petroleum industry practices; and

(c) flow meters installed after work over, modification or replacement are immediately calibrated to verify that they meet the requirements for linearity and repeatability.

28. Operating requirements for instrument part.

A licensee shall ensure that—

(a) sensors are monitored continually and regularly calibrated in accordance with these Regulations, standards approved by the Authority and best petroleum industry practices;

(b) calibration comprises of several values in the sensor's operating range;

(c) where the outlet signals from the sensors deviate from the pre-set limits, necessary maintenance and subsequent new calibration is undertaken;

(d) calibration methods used ensure that systematic metering errors are avoided or compensated for;

(e) gas densitometers are verified against calculated density or other relevant methods;

(f) online gas chromatographs are validated against a traceable reference gas with a stipulated frequency;

(g) pursuant to the uncertainty statement referred to in regulation 10, validation criteria are stipulated and if a gas chromatograph is outside the stated criteria during validation, calibration is performed and new factors are established;

(h) new validation is performed following a correction to confirm that the gas chromatograph is within the given test criteria; and

(i) variations in gas composition is monitored and, where variations exceed ± 5%, a reference gas with a different calorific value and a new linearity test is considered.

29. Operating requirements for computer part.

(1) A licensee shall ensure that all data is filed regularly.

(2) A licensee shall establish procedures for handling of fault messages from the computer part or faults otherwise discovered.

(3) A licensee shall ensure that where software changes and replacement of computer parts are done, an independent verification is carried out for the calculation requirements of the computer part.

PART V—REQUIREMENTS RELATING TO DOCUMENTATION

30. Documentation prior to start-up of metering system.

The licensee shall, after the development of the field and prior to start-up of the metering system, submit to the Authority the following documents—

(a) the technical description of the metering system;

(b) an overview showing the location of the metering systems in the process and transportation system;

(c) drawings and description of the equipment included in the metering system;

(d) a list of documentation for the metering system;

(e) a progress plan for the project up to the time of application for consent to use the metering system;

(f) a description of the licensee's and the supplier's management control system for follow up of the metering system;

(g) uncertainty analysis; and

(h) any other information that the Authority may require.

31. Documentation relating to metering system during operation.

(1) A licensee shall establish and maintain an archive which shall contain documentation in respect of the metering system.

(2) A licensee shall ensure that the quality of metering meets the requirements of these Regulations, standards approved by the Authority and best petroleum industry practices.

(3) Correction shall be made for documented metering errors.

32. Information.

(1) A licensee shall notify the Authority of any changes to the metering system that affect the quality of fiscal metering or figures reported from the metering.

(2) A licensee shall inform the Authority of the following—

(a) annual plan for activities within the technical field in question;

(b) procedure for ownership allocation of petroleum between licensees in production licences;

(c) metering errors;

(d) fiscal metering data that have been corrected based on calculations;

(e) changes in calibration intervals;

(f) changes in calculation software; and

(g) changes in aspects that formed the basis of the consent for start-up.

33. Calibration documents.

(1) A licensee shall document the description of procedure during calibration and inspection and an overview of results where metering deviation before and after calibration is shown.

(2) The documentation referred to in subregulation (1) shall be available for verification by the Authority or any other Government ministry, department or agency at the place of operation of the licensee.

PART VI—MISCELLANEOUS

34. Offence and penalty.

(1) A person who contravenes any provision of these Regulations commits an offence and is liable on conviction—

(a) to a fine not exceeding five thousand currency points or imprisonment not exceeding ten years or both;

(b) in case of a continuing offence, to an additional fine not exceeding five hundred currency points in respect of each day on which the offence continues;

(c) in case of a second or subsequent offence, to a fine not exceeding five thousand and five hundred currency points or imprisonment not exceeding twelve years or both.

(2) The Minister may, in accordance with section 90 of the Act, suspend or cancel a licence where the licensee has contravened any provision of these Regulations.

SCHEDULES

SCHEDULE 1

Regulation 4

CURRENCY POINT

One currency point is equivalent to twenty thousand shillings.

SCHEDULE 2

Regulation 10(1)

ALLOWABLE METERING UNCERTAINITY

Metering system	**Uncertainty limit at 95 percent (%) confidence level**
Oil metering fiscal and custody transfer	0.3 % of standard volume
Gas metering for fiscal and custody transfer	1.0 % of mass
Allocation meters for petroleum	5% of standard volume
Fuel gas metering	1.5% of standard volume
Flare gas metering	5.0 % of standard volume
Sales metering of liquified natural gas (LNG)	0.50 % of measured energy contents per ship load

IRENE MULONI (MP),
Minister for Energy and Mineral Development.