Flow Measurement Regulations in Alaska

Jodie Hosack, PE
Safety Moment – Recommended Contents of Home First Aid Kit

- 2 absorbent compress dressings
- 25 adhesive bandages
- 1 adhesive cloth tape
- 5 antibiotic ointment packets
- 5 antiseptic wipe packets
- 2 packets of aspirin
- 1 blanket
- 1 breathing barrier
- 1 instant cold compress
- 2 pair non-latex gloves
- 2 hydrocortisone ointment packets
- Scissors
- 1 each roller bandages (3” & 4”)
- 5 each sterile gauze pads (3”x3” & 4”x4”)
- Oral thermometer
- 2 triangular bandages
- Tweezers
- First aide instruction book

From www.redcross.org
CAUTION

• Many regulations are summarized in this presentation. Users *should not* use this material for design or installation of regulatory required flow measurement and metering installations.

• Current source regulations should always be used for installations that require conformance.
Presentation Overview

• General Definitions, Terminology and Information
  – Land Terminology
  – Flow Measurement Terminology
  – Citations of Regulations
  – API Manual of Petroleum Measurement Standards (MPMS)

• State of Alaska Agencies
  – Alaska Oil and Gas Conservation Commission (AOGCC)
  – Alaska Department of Revenue (DOR)

• United States Department of the Interior Agencies
  – Bureau of Safety and Environmental Enforcement (BSEE)
  – Bureau of Ocean Energy Management (BOEM)
  – Bureau of Land Management (BLM)

• Advice from Personal Experience
GENERAL DEFINITIONS, TERMINOLOGY AND INFORMATION
Land Terminology

• Unit
  - The joining of interests in a field to provide for development and operations without regard to separate property interests. Also, the area covered by a unitization agreement.

• Participating Area
  - Combined portion of a unitized area that is reasonably proven to produce resources in commercial quantities.

• Lease
  - A legal document executed between a mineral owner and a company or individual that conveys the right to explore for and develop hydrocarbons and/or other products for a specified period of time over a given area.
Land Terminology

UNIT

PARTICIPATING AREAS

LEASE
Alaska North Slope Unit Boundaries

North Slope Units

Map from DNR Website
Flow Measurement Terminology

- **Reservoir and process management flow meters**
  - Not typically regulated by agencies

- **Fiscal flow meters** – meters used to determine a financial transaction (taxes, royalty, sales, etc.)

- **Allocation flow meters** – meters used to allocate sales production back to producing wells
  - Regulated by both State and Federal agencies

- **Custody transfer flow meters** – meters used in transactions where ownership is transferred
  - Can be regulated by both State and Federal agencies
  - Performance targets in contractual agreements between parties
Red M (M) – Custody Transfer/Sales Meters

Black M (M) – Fiscal or Test Separator Meters

Grey M (M) – Optional Allocation or Individual Well Meters
## Typical Uncertainty Ranges

<table>
<thead>
<tr>
<th>Measurement Type</th>
<th>Typical Uncertainty Range</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Reservoir and Process Management</strong> (process control and monitoring)</td>
<td>Up to 10%</td>
</tr>
<tr>
<td>• Generally depends on the requirements of the process</td>
<td></td>
</tr>
<tr>
<td><strong>Allocation</strong></td>
<td>3 – 10%</td>
</tr>
<tr>
<td>• Generally depends on ownership differences within the allocation system</td>
<td></td>
</tr>
<tr>
<td>• Can be regulatory driven</td>
<td></td>
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<tr>
<td><strong>Custody Transfer</strong></td>
<td>&lt;0.5%</td>
</tr>
<tr>
<td>• Generally depends on commercial contractual agreements between parties</td>
<td></td>
</tr>
<tr>
<td>• Can be regulatory driven</td>
<td></td>
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</tbody>
</table>
Relevant API Manual of Petroleum Measurement Standard (MPMS) Chapters

- Chapter 4 – Proving Systems
- Chapter 5 – Metering
- Chapter 6 – Metering Assemblies
- Chapter 7 – Temperature Determination
- Chapter 8 – Sampling
- Chapter 9 – Density Determination
- Chapter 10 – Sediment and Water
  - TR 2570 and 2573
- Chapter 11 – Physical Propertied Data (Volume Correction Factors)
- Chapter 12 – Calculation of Petroleum Quantities
Relevant API MPMS Chapters

• Chapter 13 – Statistical Aspects of Measuring and Sampling
• Chapter 14 – Natural Gas Fluids Measurement
• Chapter 18 – Custody Transfer
• Chapter 20 – Allocation Measurement
• Chapter 21 – Flow Measurement Using Electronic Metering Systems
• Chapter 22 – Testing Protocols
STATE OF ALASKA AGENCIES

Alaska Oil and Gas Conservation Commission (AOGCC)
Alaska Oil and Gas Conservation Commission (AOGCC)

• Created under Alaska Statutes Title 31.05 Alaska Oil and Gas Conservation Act
  – AOGCC regulations published under 20 AAC 25

• Mission
  – To protect the public interest in exploration and development of Alaska's valuable oil, gas, and geothermal resources through the application of conservation practices designed to ensure greater ultimate recovery and the protection of health, safety, fresh ground waters and the rights of all owners to recover their share of the resource.

Department of Natural Resources (DNR) is the royalty interest owner for the State of Alaska, not AOGCC.
Pool Rules are the rules for development and operations of hydrocarbon accumulations and generally grouped by PA.

Each Pool Rule is unique but generally states basic requirements:
- Safety Valve System (SVS) specification and testing
- Well spacing
- Well test frequency and duration
- Allocation factor tolerances for stated testing requirements
- Reporting
Pool Rules – Incorporate by Reference Industry Standards

• Pool Rules may incorporate by reference industry standards in part or whole
  – For example the American Petroleum Institute (API)
    Measurement of Petroleum Standards (MPMS)

• Industry standard “shall” then become regulatory required for the pool
AOGCC Other Order No. 105 – Use of MPFMs for Well Testing and Allocation

• Rule 1 – Applicability
  – Only applies to MPFM for well testing and allocation requirements of 20 AAC 25.230
  – Use of MPFM for any other purpose must be approved by AOGCC

• Rule 2 – Use of MPFM
  – Meet the requirements of API MPMS 20.3 and have no more than +/- 5% total system uncertainty
  – Are presumptively compliant with 20 AAC 25.230 and do not require an application for use

• Rule 3 – Maintenance
  – Must be installed, operated and maintained in accordance with API MPMS 20.3 and the manufacturer’s recommendations
AOGCC Custody Transfer Requirements (20 AAC 25.228)

(a) Hydrocarbon measured prior to severance from the unit

(b) Must be fabricated, installed, and maintained per API MPMS and the commission must approve new or modified custody transfer points

(c) If totalizer is micro processor based it must have a UPS and preserve meter pulses in event of power failure

(d) Microprocessor totalizer must report raw variables

(e) Fluid samplers must be a probe or slipstream in conformance with API MPMS
AOGCC Custody Transfer Requirements (20 AAC 25.228)

(f) Bypasses are not allowed

(g) States various requirements of oil proving

(h) States prover calibration requirements

(i) Commission requires 24 hr. notice of certain operations so a representative can witness

(j) Commission can allow variances

(k) Incorporates by reference relevant API MPMS chapters
AOGCC Industry Guidance Bulletin 13-002

- Provides custody transfer meter application guidance
- Clarifies that the application must be approved by AOGCC before installation of the metering system
- Requires detailed meter station information and specifically states that sales brochures and vendor literature are not acceptable for the application
STATE OF ALASKA AGENCIES

Alaska Department of Revenue (DOR)
More Alaska Production Act

• Eliminates the progressivity tax formula in ACES to a flat tax structure
  – Increases base tax rate from 25% to 35%
  – Eliminates the 20% capital investment tax credit
  – Implements a per barrel of oil tax credit
  – Eliminates the Exploration Incentive Credit for the North Slope

• Implements a Gross Value Reduction (GVR) tax treatment to entice development of “new oil”
  – Allows for a 20% to 30% reduction in the taxable gross value of the crude from qualifying wells
  – 20% to 30% of “new oil” is tax free

• New PA’s automatically qualify for GVR regardless of metering
GVR Metering Requirements for Expansions to Existing PA’s

• Qualifying wells (full producing interval) must be within the acreage of a newly expanded participating area (PA)

• Qualifying production must be continuously metered prior to comingling with non-qualifying production (15 AAC 55.213)
  – Multi-phase flow measurement (DOR’s preferred option)
  – Custody transfer quality oil and gas measurement after mechanical separation (Regulated by AOGCC 20 AAC 25.228)
  – Custody transfer quality oil and gas measurement after mechanical separation (Meets the standards of 20 AAC 25.228)
  – Other methods of continuous metering of oil and gas
GVR MPFM Requirements for Expansions to Existing PA’s

- When using a multi-phase flow meter (MPFM), the State of Alaska DOR regulations require the following
  - MPFM have an uncertainty of +/- 5% for all phases (≥90% confidence)
  - Manufacturer’s recommendations must be followed for installation and maintenance
  - Installation must be in compliance with API Manual of Petroleum Measurement Standards (MPMS) Chapter 20.3
UNITED STATES
DEPARTMENT OF THE
INTERIOR AGENCIES

Bureau of Safety Environmental Enforcement (BSEE)
Bureau of Ocean Energy Management (BOEM)
Federal Agencies

BSEE
Bureau of Safety and Environmental Enforcement

BOEM
Bureau of Ocean Energy Management

NATIONAL SYSTEM OF PUBLIC LANDS
U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Bureau of Safety and Environmental Enforcement (BSEE)

- Formed in 2011 from the reorganization of the Minerals Management Service (MMS)

- **Mission Statement:** The Bureau of Safety and Environmental Enforcement (BSEE) works to promote safety, protect the environment, and conserve resources offshore through vigorous regulatory oversight and enforcement.
Bureau of Ocean Energy Management (BOEM)

- Formed in 2011 from the reorganization of the Minerals Management Service (MMS)

- **Mission Statement:** BOEM promotes energy independence, environmental protection and economic development through responsible, science-based management of offshore conventional and renewable energy and marine mineral resources.
BSEE and BOEM Regulations

• Governing Statutes
  – Outer Continental Shelf Lands Act (OCSLA) of 1953
  – Federal Oil and Gas Royalty Management Act (FOGRMA) of 1982

• Code of Federal Regulations (CFR)
  – BSEE: Title 30 – Chapter II – Subchapter B – Part 250 – Subpart L
  – BOEM: Title 30 – Chapter V

National Archives and Records Administration

code of federal regulations
BSEE and BOEM Regulations

• Federal Register
  – Publishes notices, advanced notices of proposed rulemaking, proposed rules, interim rules, final rules and semiannual regulatory agenda

• Notice to Lessees (NTL)
  – Formal documents that provides lessees and operators:
    – Clarification, description or interpretation of a regulation or standard
    – Implementation of a special lease stipulation or regional requirement
UNITED STATES
DEPARTMENT OF THE
INTERIOR AGENCIES

Bureau of Land Management (BLM)
Bureau of Land Management (BLM)

- Created in 1946 through a merger of the General Land Office (GLO) and the U.S. Grazing Service, has roots going back to the creation of the GLO in 1812.

- The Bureau of Land Management (BLM) manages vast stretches of public lands that have the potential to make significant contributions to the Nation’s renewable energy portfolio. This gives the BLM a leading role in fulfilling the Administration’s goals for a new energy economy based on a rapid and responsible move to large-scale production of solar, wind, geothermal, and biomass energy. The BLM also manages Federal onshore oil, gas and coal operations that make significant contributions to the domestic energy supply as the Nation transitions to a clean energy future.
BLM Current Regulations

• Code of Federal Regulations
  – Title 43 – Subtitle B – Chapter II – Subchapter C – Part 3160
    – §3162.7-2 Measurement of Oil
      – Allows for manual tank gauging, positive displacement meters or other methods approved by the authorized officer (AO)
    – §3162.7-3 Measurement of Gas
      – Allows for orifice meters or other methods acceptable to the AO
    – §3162.7-5 Site Security on Federal and Indian oil and gas leases
      – Requirements for valve sealing, non-resettable totalizers, no bypasses, theft or mishandling, site security plans, site facility diagrams

• Onshore Orders (effective year 1989)
  – Onshore Order 3 – Site Security
  – Onshore Order 4 – Measurement of Oil
  – Onshore Order 5 – Measurement of Gas
BLM Current Regulations

• National Instruction Memoranda (IM)
  – IM 2013-152, Reviewing Requests for Surface and Downhole Commingling of Oil and Gas Produced from Federal and Indian Leases
    – Category 1 – No royalty impacts
    – Category 2 – Low volume properties with potential royalty impacts
    – Category 3 – Overriding considerations (i.e. financial or environmental)
  – IM 2011-184, Policy for Approving Requests for Commingling and Allocation Approval (CAA)

• Notice to Lessees (NTL)
  – Alaska State Office NTL 2009-1 – Standards for the Use of Electronic Flow Computers Used on Differential Type Flow Meters for Gas Measurement
BLM Point of Royalty Measurement (PRM)

Drillsite

Oil field "A"

Gas flare

Processing plant

Gas transportation system (pipeline,..)

Oil transportation system (pipeline, tanker, ...)

Many contributing wells

Water injection

Multiphase flow pipeline

Oil field "B"

Oil field "C"

Two PAs

Point of Royalty Measurement (per PA) – to custody transfer quality

Figure from Wikipedia: The Free Encyclopedia
BLM Proposed Rules – Recently Published in the Federal Register

- **Site Security** - 80 FR 40767-40894 (July 13, 2015)
  - Amends 43 CFR §3160
  - Adds 43 CFR §3170 and §3173

- **Measurement of Oil** - 80 FR 58952-58979 (Sept. 30, 2015)
  - Amends 43 CFR §3160 and portions of §3170
  - Adds 43 CFR §3174

  - Amends 43 CFR §3160 and portions of §3170
  - Adds 43 CFR §3175

Once codified in the CFR, the new rules will replace the 1989 Onshore Orders 3, 4 and 5
Advice on BLM Proposed Rules

• The Proposed Rules do not include a grandfathering clause. All BLM regulated installations are expected to come into conformance with the new rules once they are codified in the CFR.

• The conformance schedules outlined in the Proposed Rules are fairly aggressive.

If working on new BLM regulated metering installations or if responsible for an existing BLM regulated metering, start reviewing the Proposed Rules NOW.
Advice on Uncertainty Calculations

• Work uncertainty calculations early, they could be more complicated than you expect
  – Uncertainty estimates for sampling, shrinkage factor, etc.

• Keep them evergreen, as necessary

• Know the leveraging influences on the measurement uncertainty and manage accordingly
General Advice from Personal Experience

• When multiple regulating agencies and/or multiple interest owners are involved ensure alignment between parties early

• Know the regulations and commercial agreements that metering installations must conform to
  – If you don't know, FIND OUT!

• Keep a copy of relevant regulations and API MPMS standards handy for reference

• When engineering regulatory required metering installations, manage down to the smallest details
  – Don't forget to keep future maintenance, testing and reporting requirements in mind during engineering phase of projects