

Draft for Consultation

**Goal Oriented  
Drilling and  
Production  
Regulations – April  
2005**

## Background

For additional information, the reader should refer to the Board's letter entitled "Public Comment Period, Development of Goal Oriented Drilling and Production Regulations," dated 11 April 2005.

Included in the scope of the goal oriented rewrite of the Drilling and Production Regulations are the following six topics:

- Measurement
- Evaluation of Wells, Pools, and Fields
- Testing and Reporting Requirements for Safety Systems
- Casing
- General Well Control Requirements
- Testing of Well Control Equipment

These six topics were chosen as a result of initial discussions with the regulators involved in the project and the oil and gas industry, as to what sections of the Drilling and Productions Regulations are most suited to a goal oriented rewrite.

All section numbers noted for replacement in the attached goal oriented drafts refer to the numbering scheme within the draft Drilling and Production Regulations, which are currently progressing through the regulatory review process in the federal Department of Justice. Further, for ease of reference, the drafts refer to the draft Drilling and Production Regulations developed under the *Canada Oil and Gas Operations Act* (COGOA) only; therefore, section numbers do not correspond to the draft Drilling and Production Regulations developed under the Offshore Accord Acts<sup>1</sup>. However, as regulations developed under the COGOA and the Offshore Accord Acts mirror one another, the wording that will appear in the Drilling and Production Regulations developed under the COGOA or the Offshore Accord Acts will be very similar, if not, identical. The draft Drilling and Production Regulations developed under the COGOA are

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<sup>1</sup> The *Canada-Newfoundland Atlantic Accord Implementation Act*; the *Canada-Newfoundland and Labrador Atlantic Accord Implementation Newfoundland and Labrador Act*; the *Canada-Nova Scotia Offshore Petroleum Resources Accord Implementation Act*; and the *Canada-Nova Scotia Offshore Petroleum Resources Accord Implementation (Nova Scotia) Act*.

available on the Board's web site ([www.neb-one.gc.ca](http://www.neb-one.gc.ca)) under the buttons "Engaging Canadians"/"Drilling and Production Regulations" on the home page.

Development of accompanying guidance notes will also be part of the goal oriented rewrite of the Drilling and Production Regulations. This phase of the project has not yet begun.

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### General Well Control Requirements

*(Would replace sections 63-73 of the draft DP Regs)*

**63. (1)** Every operator shall ensure that during all well operations, reliably operating well control equipment is installed, the purpose of which is to:

- (a) control kicks;
- (b) prevent blow-outs; and
- (c) safely achieve all well activities and operations, including drilling, completion, and workover operations.

**(2)** After setting the surface casing, every operator shall ensure that during all well operations, there are at least two independent and tested well barriers in place.

**(3)** If a barrier fails, no other activities, other than those intended to restore the barrier, shall take place in the well.

**(4)** During drilling and completion operations, except when drilling under balanced, one of the two barriers to be maintained shall be the drilling fluid column.

**64.** Every operator shall ensure that drilling and well control equipment is designed, operated, installed, and maintained in accordance with good oilfield practices, and in accordance with all relevant American Petroleum Institute publications, as amended from time to time.

## Casing

(Would replace sections 75-89 and 93 of the Draft DP Regs)

### General

75. Every operator shall submit to the Board, as part of an application for Approval to Drill a Well, a casing and cementing program, the purpose of which, is to:

- (a) properly control formation pressures and fluids;
- (b) prevent the direct and indirect release of fluids from any stratum through the well bore;
- (c) prevent communication between separate hydrocarbon bearing strata;
- (d) protect fresh water aquifers from contamination;
- (e) support unconsolidated sediments, protect and isolate all permafrost and hydrate strata; and
- (f) provide for the efficient production and injection of well fluids.

### Casing Design

76. (1) Every operator shall ensure that any casing used in a well

- (a) is new; or
- (b) if used, is inspected as per API RP- 5C1, *Recommended Practice for Care and use of Casing and Tubing*, as amended from time to time.

(2) Casing and connections must meet or exceed the minimum performance properties listed in API BUL. 5C2, *Performance properties of Casing, Tubing and Drill Pipes*, as amended from time to time.

77. (1) Every operator shall design the casing to withstand the anticipated stress imposed by tensile, burst, collapse, bending, buckling loads, thermal effects, and combinations thereof.

(2) The minimum design factors used in casing design should ensure that the casing can withstand the maximum loads that will be imposed on it during installation, drilling and production activity.

(3) Every operator's design must consider, but need not be limited to, type of well, water depth (for offshore wells), potential for high pressure zones, metallurgical considerations, and the potential for H<sub>2</sub>S or CO<sub>2</sub>.

78. The shoe setting depth should be carefully chosen to allow for:

- (a) maximum formation fracture gradient;
- (b) minimum hole problems;
- (c) formation evaluation requirements; and
- (d) kick margin considerations.

#### **Production Tubing**

79. Every operator shall ensure that the tubing used in a well is designed

- (a) to permit the installation of artificial lift equipment wherever there is reason to believe that artificial lift equipment might be required in order to maintain flow rates and increase ultimate recovery from the pool or field;
- (b) to withstand the conditions, forces, and stresses that might have a detrimental effect on the tubing; and
- (c) with respect to sour service, to meet National Association of Corrosion Engineers, NACE Standard MR0175-92 Item No. 53024, *Standard Material Requirements, Sulfide Stress Cracking Resistant - Metallic Materials for Oilfield Equipment*, as amended from time to time.

#### **Cementation**

80. (1) Cement slurry design and procedure shall achieve the following:

- (a) prevent the movement of formation fluids in the annuli (casing to formation or casing to casing);
- (b) provide support for the casing; and
- (c) retard corrosion of the casing.

(2) Every operator shall ensure that the conductor casing, permafrost casing, and surface casing are cemented, from the shoe of the casing to the top of the casing.

(3) Every operator shall ensure that in the case of

- (a) intermediate casing, the cement will rise to a minimum of 300 m above the casing shoe or 150 m above the base of the permafrost: and

(b) production casing, adequate cement is used to isolate oil, gas, or water zones to a minimum of 60 m above and 30 m below the zone.

#### **Liners**

81. Every liner shall be cemented for its full length.

#### **Waiting on Cement Time**

82. After cementation of any casing and before resumption of drilling, every operator shall ensure that the time interval while waiting for cement to harden is in no case less than 6 hours and is less than 12 hours only where the operator determines, by testing representative samples of the cement, that the cement has a minimum compressive strength of at least 3,500 kPa.

#### **Casing Pressure Testing**

83. (1) After running casing and cementing and prior to resuming any drilling or undertaking any down-hole operations, every operator shall pressure test surface and intermediate casing to 70% of the minimum internal yield pressure, or to the maximum calculated surface pressure, whichever is the lesser.

(2) Every operator shall pressure test production casing to 100% of the maximum calculated surface pressure.



### Testing of Well Control Equipment

(Would Replace Sections 90 – 92 of the Draft DP Regs)

90. (1) Testing of well control equipment shall be conducted as per the testing and maintenance requirements for surface and subsurface BOP stacks and well control equipment stated in API Recommended Practice 53, *Recommended Practices for Blowout Prevention Equipment Systems for Drilling Wells*, as amended from time to time.

(2) Pressure control equipment associated with coil tubing, slickline, and wireline operations shall be pressure tested upon installation and as appropriate, to ensure the continued safe operation of the equipment.

## **Evaluation of Wells, Pools and Fields**

*(Would Replace Part V – sections 94-117 of the draft DP Regs)*

### **General**

**95. (1)** Every operator shall obtain from each well sufficient cutting and fluid samples, logs, conventional cores, side wall cores, pressure measurements and formation flow and well tests, analyses and surveys, using good oilfield practice, to ensure that a comprehensive geological and reservoir evaluation can be made.

**(2)** Every operator shall obtain sufficient pool pressure measurements, fluid samples, cased hole logs and well tests to ensure a comprehensive assessment can be made of the performance of development wells, pool depletion schemes and fields.

**95.1. (1)** Every operator shall submit to the Board, for approval, a well data acquisition program.

**(2)** The Board shall approve the well data acquisition program where the Board is satisfied that the program provides for a comprehensive geologic and reservoir evaluation and does not cause waste.

**(3)** Every operator shall, 90 days prior to initiating development well drilling in a field, submit to the Board, for approval, a field data acquisition program.

**(4)** The Board shall approve the field data acquisition program where the Board is satisfied that the program provides for a comprehensive assessment of the performance of development wells, pool depletion schemes and fields.

**95.2.** Where part of the well or field data acquisition program referred to in section 95.1 cannot be achieved, every operator shall:

**(a)** immediately notify a Conservation Officer of the deferment;

**(b)** submit a program, to the Board, for approval, detailing the procedures to be used to obtain the information that would have been obtained.

### **Drill Cuttings and Gas Content of Drilling Fluid**

**96. (1)** Every operator shall:

**(a)** determine and record the hydrocarbon gas content of all drilling fluid returning to the surface; and

(b) ensure samples of drill cuttings are collected from those portions of the well set out in the well data acquisition program.

(2) For samples not obtained, every operator shall, in the final well history report, report to the Chief Conservation Officer, the depth intervals along with the reason for not obtaining the samples.

#### **Cores and Cutting Samples**

96.1. Every operator shall ensure that cores and cutting samples taken pursuant to Section 95 are handled, marked, described and analysed in accordance with good oilfield practice.

#### **Formation Evaluation Logging**

96.2. Every operator shall ensure sufficient logs are run below the surface casing to allow for determination of lithology, net pay, porosity, fluid saturation, pool pressure and fluid contacts.

96.3. Every operator shall take formation evaluation logs in the hole drilled for the surface casing, if needed for the purposes of well evaluation.

#### **Cased Hole Logging**

96.4. Every operator shall run a cased hole log on a well if it is technically feasible to do so and the cased hole log would significantly contribute to the evaluation of the pool in which the well is located.

#### **Formation Pressure Measurements, Formation Flow and Well Testing**

*At this time, proposed wording for sections 96.5-96.9 regarding formation pressure measurements, formation flow testing, and well testing is not available. A sub-working group within the project working group is continuing to look at these sections. Work being undertaken on issues surrounding well testing by the Atlantic Energy Roundtable may also guide the development of wording.*

#### **Fluid Samples**

96.10. (1) Where an operator completes a well in a pool, every operator shall take a representative sample of reservoir fluids from the well where it would contribute to the evaluation of the pool or field in which the pool is located.

(2) Every operator shall obtain and analyze oil, gas and water samples from a sufficient number of wells to determine the composition of:

- (a) fluids in the pool,
- (b) fluids injected into a pool, and
- (c) produced fluids used as fuel, discharged or transferred from a production facility,

at least once every 12 months.

(3) Every operator shall obtain and analyze samples of oil, gas and water whenever there is reason to believe that the composition of a fluid produced from a pool has changed from that determined in the analysis undertaken pursuant to subsection (2).

(4) Every operator shall ensure that every fluid sample is taken and analyzed in accordance with good oilfield practices.

#### **Pool Pressure Surveys or Measurements**

**96.11.** Before an operator commences production from or injection into a development well, the static pressure of the pool at the completion interval shall be determined and recorded.

**96.12. (1)** Every operator shall conduct an annual pool pressure survey to determine the static pressure in a pool in accordance with an approved field data acquisition program.

(2) Every operator shall report the results of the survey to the Chief Conservation Officer together with the Annual Production Report.

#### **Submission of Samples and Data**

**96.13.** Every operator shall ensure that all cuttings samples, fluid samples, cores or other materials taken from a well in compliance with these Regulations are:

- (a) transported and stored in a manner that prevents any loss or deterioration;
- (b) delivered to the Board within 60 days of the well termination date unless analyses are ongoing, in which case they, or the remaining parts, are to be delivered on completion of the analyses; and
- (c) stored in durable containers properly labelled for identification.

**96.14.** Every operator shall ensure that after any samples necessary for the analysis referred to in Section 96.1 have been removed from the core, the remaining core or a longitudinal slab of the core that is not less than one

half of the cross-sectional area of the core is submitted to the Chief Conservation Officer.

**96.15.** Before disposing of cuttings samples, fluid samples, cores, evaluation data or other materials taken from a well in compliance with these Regulations, every operator shall notify, in writing, the Chief Conservation Officer and give the Chief Conservation Officer an opportunity to request delivery of the sample, core or data.

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### **Testing and Reporting Requirements for Safety Systems**

(Would replace sections 123 and 124 of the draft DP Regs)

**123. (1)** Every operator shall submit to the Board, as part of an application for an operations authorization, a maintenance and testing program for its safety systems, including valves, sensors, and all related components.

**(2)** Every operator shall ensure that the program referred to in subsection (1) results in high reliability of safety and environmental protection systems at any installation.

**(3)** The program should be prepared using risk-based methodology for the analysis of the testing system as a whole, and the program must consider:

- (a)** the safety equipment design and specification;
- (b)** operating conditions;
- (c)** the maintenance program;
- (d)** the safety system testing frequency;
- (e)** operating procedures;
- (f)** other safety equipment associated with the safety system; and
- (g)** reporting requirements to the Board, in the event of an unsuccessful test of the system or failure of the system.

## Measurement

*(Would replace Part XI, sections 151-170 of the draft DP Regs)*

**163.** Subject to Section 164, every operator shall measure and record the rate of flow and the total volume of:

- (a) each fluid that is
  - (i) produced from each well,
  - (ii) injected into each well; and
  - (iii) transferred, flared, or used from the production installation;
- (b) each fluid that enters or leaves a battery, facility, or processing plant.

**164. (1)** Every operator shall submit to the Board an application for approval of a flow system, a flow calculation procedure, and a flow allocation procedure that will permit reasonably accurate determination of the measurements prescribed pursuant to Section 163 and, on a pool and zone basis, the production from and injection into individual wells.

(2) Every operator shall conduct any measurements required pursuant to subsection (1), in accordance with good oilfield practice.

(3) Every operator shall measure and allocate oil, gas and water in accordance with the approved flow system, flow calculation procedure, and flow allocation procedure submitted pursuant to subsection (1) and shall not make any changes to the equipment and procedures outlined therein, without approval of the Board.

(4) Every operator shall allocate group production of oil and gas from wells and injection of a fluid into wells on a pro rata basis to the wells in accordance with the approved flow system, flow calculation procedure, and flow allocation procedure submitted pursuant to subsection (1).

(5) Where a well is completed over multiple pools and zones, every operator shall allocate prorated production or injection volumes for the well on a pro rata basis to the pool and zones in accordance with the approved flow allocation procedure submitted pursuant to subsection (1).

## Testing, Maintenance, and Notification

**165. (1)** Every operator shall calibrate and maintain meters and associated equipment to ensure measurement accuracy is maintained.

**(2)** Every operator shall ensure that equipment used to calibrate the flow system is certified annually and the calibration is traceable to an industry recognized standard.

**(3)** Every operator shall repair or replace forthwith any component of the flow system, which is not functioning in accordance with manufacturer's specifications.

**(4)** Every operator shall notify a conservation officer forthwith, of any malfunction or failure of any flow system component and of the action being taken to remedy the malfunction or failure.

**(5)** Every operator shall ensure that personnel responsible for the maintenance and operation of the flow system, the flow calculation procedure, and flow allocation procedure are qualified and are properly trained.

**(6)** The Chief Conservation Officer may from time to time direct that any measuring appliance shall be tested or examined in a manner, upon such occasions or at such intervals as may be specified by the Chief Conservation Officer in a directive, and the operator shall pay, to any such person or to the Chief Conservation Officer, any fees and expenses, for the test or examination, as the Chief Conservation Officer may specify.

#### **Transfer Meters**

**166. (1)** Every operator shall notify a conservation officer at least 14 days prior to calibration of any transfer meter prover or master meter used in conjunction with a transfer meter.

**(2)** Every operator shall submit a copy of the calibration certificate to the Chief Conservation Officer forthwith following completion of the calibration.

#### **Metering Records**

**167.** Every operator shall keep a record of the flow through each group production meter or test production meter used by the operator and retain the record until production from the pool or field is abandoned.

#### **Testing Frequency**

**168.** Every operator of a development well that is producing oil or gas shall test the well at sufficient



frequency that will permit reasonably accurate determination of production of oil, gas, and water on a pool and zone basis.

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