

SURVEYS AND MAPPING BRANCH  
DEPARTMENT OF LANDS AND FORESTS  
VICTORIA, B.C.



ALL COMMUNICATIONS IN REFERENCE TO SURVEYS, MAPS,  
AND AIR PHOTOS SHOULD BE ADDRESSED TO THE  
DIRECTOR OF SURVEYS AND MAPPING

THE REPLY TO THIS LETTER SHOULD BE MARKED  
FOR THE ATTENTION OF:

AIR DIVISION.....  
GEOGRAPHIC DIVISION.....  
LEGAL SURVEYS DIVISION.....  
TOPOGRAPHIC DIVISION.....

YOUR FILE NO.

PLEASE QUOTE OUR FILE NO.

0583/3.2

October 3, 1961.

CIRCULAR LETTER

TO ALL BRITISH COLUMBIA LAND SURVEYORS AND REGISTRARS,  
LAND REGISTRY OFFICES.

Sir:

Attached, for your information, is a copy of  
"Regulations Governing the Drilling of Wells and the  
Production and Conservation of Oil and Natural Gas",  
which were published in the B.C. Gazette, Part II, on  
August 24th, 1961.

These Regulations were made by Order-in-Coun-  
cil No. 2033/61, approved August 14th, 1961, and issued  
under authority of the Petroleum and Natural Gas Act.

Your attention is directed particularly to  
Regulation 25 (3) (e) to (m), pages 15 to 19 inclusive,  
which deals with the new survey requirements covering  
wellsite locations. In accordance with Regulation 25  
(3) (m), these survey requirements became effective on  
September 23rd, 1961.

It will be noted that no longer is any dif-  
ferentiation made between wellsites in Crown lands and  
those in alienated lands, the Final Survey in both cases  
now requiring the services of a British Columbia Land  
Surveyor.

Yours truly,

Encl:

G. S. Andrews,  
Surveyor-General & Director.

BRITISH COLUMBIA DEPARTMENT OF MINES  
AND PETROLEUM RESOURCES

HON. W. K. KIERNAN, *Minister*

P. J. MULCAHY, *Deputy Minister*

J. D. LINEHAM, *Chief Conservation Engineer*

PETROLEUM AND NATURAL GAS ACT

**REGULATIONS**

Governing the Drilling of Wells and  
the Production and Conservation of  
Oil and Natural Gas

Order in Council No. 2033/61  
August 14th, 1961

PRICE, 50 CENTS



Printed by A. SUTTON, Printer to the Queen's Most Excellent Majesty  
in right of the Province of British Columbia.

1961



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AND PETROLEUM RESOURCES

HON. W. K. KIERNAN, *Minister*      P. J. MULCAHY, *Deputy Minister*  
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## PETROLEUM AND NATURAL GAS ACT

### Regulations Governing the Drilling of Wells and the Production and Conservation of Oil and Natural Gas

(Made by Order in Council No. 2033, Approved August 14th, 1961)

1. In this regulation, unless the context otherwise requires, “allowable rate of production” means the quantity of oil or natural gas authorized by an officer of the Branch to be produced in any specified period;

“Branch” means the Petroleum and Natural Gas Branch of the Department of Mines and Petroleum Resources;

“Chief of the Branch” means the administrator of the Branch;

“Committee” means the Conservation Committee appointed under section 84 of the *Petroleum and Natural Gas Act, 1954*;

“day” means a period of twenty-four consecutive hours commencing at 8 o'clock in the morning;

“gas-oil ratio” means the ratio of the number of standard cubic feet of natural gas produced to the number of barrels of oil produced;

“officer of the Branch” means any engineer, geologist, or engineering assistant employed by the Branch;

“oil” means petroleum;

“pool” means an underground accumulation of oil or natural gas, or both, separated or appearing to be separated from any other such accumulation;

“potential” means the capacity of a well to produce oil or natural gas under conditions approved by the Chief of the Branch;

“reasonable market demand” means the demand for oil or natural gas for reasonable current requirements



and current consumption or use within and outside the Province, together with such amounts as are reasonably necessary for building up or maintaining reasonable storage reserves and working-stocks of oil and natural gas and the products thereof;

“spacing area” means the drainage area allocated to a well for the purpose of drilling for and producing oil or natural gas, and includes at all depths the sub-surface areas bounded by the vertical planes in which the surface boundaries lie;

“waste,” in addition to its ordinary meaning, means “waste” as that term is understood in the oil and natural-gas industry, and includes the underground or surface loss of potentially recoverable oil or natural gas and wasteful operations, which include

(i) the locating, spacing, drilling, equipping, completing, operating, or producing of a well in a manner that results or tends to result in reducing the quantity of oil or natural gas ultimately recoverable from a pool under sound engineering practices and economic principles;

(ii) the locating, drilling, equipping, completing, operating, or producing of a well in a manner that causes or tends to cause excessive surface loss or destruction of oil or natural gas;

(iii) the inefficient, excessive, or improper use or dissipation of reservoir energy, however caused;

(iv) the failure to use suitable and timely artificial, secondary, or supplementary recovery methods in a pool where it appears probable, on the basis of available information, that any of such methods would result in increasing the quantity of oil or natural gas ultimately recoverable from a pool under sound engineering practices and economic principles;

(v) the escape or the flaring of natural gas if it appears that, in the public interest and under sound engineering practices and in the light of economics and the risk factor involved, the natural gas could be

gathered, processed if necessary, and it or the products therefrom marketed, stored for future marketing, or beneficially injected into an underground reservoir;

(vi) the inefficient and improper storing of oil or natural gas, whether on the surface or underground;

(vii) the production of oil or natural gas in excess of proper storage facilities or of transportation and marketing facilities or of market demand thereof; and

(viii) the use of natural gas for purposes other than gas-lift, repressuring, recycling, pressure maintenance, or for light or as fuel, unless such use is beneficial, in the public interest, and efficient;

“week” means the period between 8 a.m. Sunday morning to 8 a.m. of the succeeding Sunday morning;

“well” means any hole into the ground, excepting seismic shot-holes and structure test-holes, made or being made by drilling or boring, or in any other manner for the purpose of searching for or producing oil or natural gas, or which is incidental to the production thereof, or for the injection of any fluid into an underground reservoir, or through which any oil or natural gas is obtained or obtainable;

“zone” means a stratum designated by the Chief of the Branch as a zone, either generally or in respect to a designated area.

#### *Application and Administration*

2. This regulation applies to every well in the Province.
3. This regulation shall be administered by the Branch.

#### *Conservation*

4. (1) The Committee may make rules of practice governing its hearings and procedure and regulating the places and times of its sittings and, in the conduct of its hearings, the Committee is not bound by the rules of evidence applicable to proceedings in Court.



(2) Hearings by the Committee shall be held by order of the Chairman and only after reasonable notice has been given.

(3) For the purpose of holding a hearing, two members of the Committee shall constitute a quorum.

(4) (a) The Minister may, of his own motion, request a hearing, and upon the application in writing of any interested person he shall, unless he considers the application to be frivolous or vexatious, order the Committee to hold a hearing with respect to any matter.

(b) The hearing referred to in clause (a) may include appeals from any decision made by an officer of the Branch and may or may not be heard in camera, as, in the opinion of the Minister, circumstances warrant.

(c) An applicant under clause (a) shall furnish the Minister with such data, information, and material as he may require.

(d) Subsequent to any such hearing the Committee shall make recommendations to the Minister, and the Minister, at his discretion, may make such order as he deems necessary, and the Minister's decision shall be final.

(5) The Committee may appoint from time to time one or more experts or persons, having special technical or other knowledge of any matter before the Committee, to inquire into and report to the Committee in respect of the matter in question, any of which experts or persons may or may not be an employee of the Crown.

5. The Chief of the Branch may, by general or special orders,

(a) designate a field by describing the surface area thereof;

(b) designate a pool by describing the surface area vertically above the pool and by naming the geological formation and the zone in which the pool occurs;

(c) determine whether a field or pool as described under clause (a) or (b) shall be operated for the production of oil or natural gas, or both;

(d) designate the area that is to be allocated to a well in connection with fixing allowable production;

(e) control and regulate the production of oil, natural gas, and water by restriction, or prohibition;

(f) require the disposal into an underground formation or otherwise, in accordance with such terms and conditions as he may prescribe, of any water produced;

(g) designate a stratum as a zone, either generally or in respect to a designated area;

(h) in order to prevent waste, require the repressuring, recycling, or pressure-maintenance of a pool or portion thereof and, for or incidental to such purpose, require the introduction or injection into any pool or portion thereof of natural gas, water, or other substances; and,

(i) in order to prevent waste, require that any natural gas be gathered, processed if necessary, and the natural gas or products therefrom marketed or injected into an underground reservoir for storage or for any other purpose.

6. Except with the approval of the Chief of the Branch, and upon the terms and conditions prescribed by him, no person shall give effect to a scheme for

(a) repressuring, recycling, or pressure-maintenance in any field or pool; or

(b) the processing, storage, or disposal of natural gas; or

(c) the gathering, storage, and disposal of water produced from any field or pool.

#### *Escape of Fluids*

7. If at any time a leakage of oil or natural gas from a well is not prevented or if a flow of water is not controlled, an officer of the Branch may take such means as may appear to him to be necessary or expedient in the public interest to control and prevent the leakage of oil, natural gas, or water.

#### *Order to Shut in Well*

8. (1) (a) If the Chief of the Branch is satisfied, after an inquiry held upon such notice and to such persons as he deems proper, that a producing well is being operated in such



a way that any provision of the Act, of the regulation, or of an order of the Branch made according to either of them is contravened or ignored, he may order that, on and after a date to be fixed by the order, no production shall be taken from the well and that the well shall be shut in and kept shut in until the order is rescinded.

(b) If, in the opinion of an officer of the Branch, waste, pollution, or damage to property can thereby be prevented, the officer may order a producing well to be shut in pending an inquiry under subsection (1) (a).

(2) Where it appears to an officer of the Branch that a method or practice being employed in any drilling, completion, suspension, or abandonment operation is in any way inadequate, improper, or hazardous, he may order orally, confirmed by a note in the daily drilling report book, that the operation be discontinued until methods approved by him are adopted.

#### *Unit Operations*

9. (1) To effect the intent, purpose, and objective of this regulation, all personnel of the Branch shall promote and assist all efforts initiated by operators of oil and natural-gas interests in any pool so designated to consolidate, merge, or otherwise combine their interests for the purpose of accomplishing the more efficient and more economical development and production of the oil and natural-gas resources of the pool, irrespective of whether such purpose be accomplished by unitization, co-operative development, or joint participation.

(2) No agreement for the unitization of a pool or any portion thereof shall be put into effect without the written approval of the Chief of the Branch.

#### *Pooling*

10. (1) Where two or more operators have locations within a spacing area or part of a spacing area, the operators may pool their locations for the development and operation of the spacing area.

(2) In the absence of voluntary pooling, the Chief of the Branch may, upon the application of an operator who is the title-holder of a location within a spacing area, order that an inquiry be held.

(3) The Chief of the Branch, subsequent to such an inquiry, may make an order pooling all locations within a spacing area or part of a spacing area for the development and operation of the spacing area.

(4) Every pooling order shall provide for

(a) the drilling, completing, and operating of a well;

(b) the payment of the actual cost of such drilling, completing, and operating by the operators whose locations are pooled; and

(c) the allocation to each operator of his just and equitable share of the allowable production for the spacing area.

(5) The Chief of the Branch in his order may specify that in the event production of oil or natural gas has been obtained, and the owner of a location fails to pay his share of the actual cost of drilling and completing the well by such time as may be specified in the order, then the amount payable by such owner shall include in addition to his location's share of the actual drilling and completing a penalty payable to the person doing the drilling and completing, of one-half of the location's share of the actual cost of drilling and completing. Such penalty shall be recoverable only out of such owner's share of production from the spacing area.

(6) Where a pooling order has been made,

(a) operations incidental to the drilling of a well in the spacing area shall for all purposes be deemed to be operations carried on or conducted by the several operators respectively upon their separate locations in the area; and

(b) that portion of the allowable production allocated to each operator shall be deemed to have been produced by a well drilled on the location of which the operator is the title-holder.



### *Allowable Rates of Production*

11. (1) No person shall produce or cause to be produced oil or natural gas from a well until an allowable rate or interim allowable rate of production has been set for the well or for the pool in which the well is completed, except such quantities as may be required for initial production and evaluation tests.

(2) The allowable rate of production for a well shall be set by an officer of the Branch upon application of the operator.

(3) The allowable rate of production may be changed upon application of the operator.

(4) Where, in the opinion of an officer of the Branch, adequate supporting information is not submitted with the application, an interim allowable rate of production may be set by him for such period as he deems necessary.

### *Timber Damage*

12. An operator shall not do unnecessary damage to timber, and shall observe and comply with all the provisions of the *Forest Act* and the regulations made thereunder.

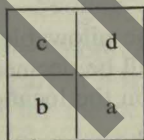
### *Well-spacing and Target Areas*

13. (1) A unit, as defined in the Act, shall be subdivided, for the purpose of well-spacing, into four approximately equal parts, to be designated as quarter-units, as follows:—

(a) Within the Peace River Block, the quarter-units shall correspond to legal subdivisions, or what would be legal subdivisions if the unit were surveyed:

(b) (i) In areas other than within the Peace River Block, the quarter-units shall be formed by joining the mid-points of the opposite sides of a unit:

(ii) Quarter-units shall be designated as shown hereunder:—



(2) In certain areas lying south of the 54th parallel of latitude, the normal spacing area may be designated to coincide with the survey system in the area.

### *Oil Wells*

14. (1) The normal spacing area for an oil well shall be one unit.

(2) The target area for an oil well in a normal spacing area shall be a square area defined as follows:—

(a) The east side of the square-target area shall be parallel to the north-south centre line of the spacing area:

(b) The centre of the target area shall be at the intersection of the two lines joining the mid-points of the opposite sides of quarter-unit d:

(c) The side dimension of the target area on the surface and at any depth shall be 660 feet.

(3) No part of the section of an oil well through the producing zone shall be nearer than 165 feet to the boundary of the spacing area upon which it is located, except where a well is classified under section 16 (2) as a wildcat well.

(4) Where an oil well, other than a wildcat well, is completed outside its target area, the off-target factor, to be used in determining the allowable rate of production, shall be the ratio of the appropriate area, prescribed as follows, to the area of the normal spacing area:—

(a) If the well be completed within quarter-unit d, the sum of the areas of quarter-units a, b, and c plus four times the product of the shortest distances from the uppermost point of intersection of the well-bore with the productive zone to the two nearest boundaries of quarter-unit d:

(b) If the well be completed within quarter-unit a or c and within what would be the target area if quarter-unit a or c contained the target area, the area of quarter-unit a or c, as the case may be:

(c) If the well be completed within quarter-unit a or c and outside what would be the target area if quarter-unit a or c contained the target area, four times the



product of the shortest distances from the uppermost point of intersection of the well-bore with the productive zone to the two nearest boundaries of quarter-unit a or c, as the case may be:

- (d) If the well be completed within quarter-unit b and within what would be the target area if quarter-unit b contained the target area, twice the area of quarter-unit b:
  - (e) If the well be completed within quarter-unit b and outside what would be the target area if quarter-unit b contained the target area, the area of quarter-unit b plus four times the product of the shortest distances from the uppermost point of intersection of the well-bore with the productive zone to the two nearest boundaries of quarter-unit b.
- (5) The Chief of the Branch, at his discretion, may exempt an off-target oil well from reduction of the allowable rate of production under subsection (4) if, in his opinion, the circumstances justify such exemption.

#### *Natural-gas Wells*

15. (1) The normal spacing area for a natural-gas well shall be four units comprising an area of two units by two units, as follows:—

- (a) Within the Peace River Block, the normal spacing area shall be based on a surveyed section:
  - (b) In areas other than within the Peace River Block, the normal spacing area shall be based on an initial four-unit area centred on a corner common to any four grid blocks, as defined in the Act.
- (2) The target area for a natural-gas well in a normal spacing area shall be a square area defined as follows:—
- (a) The east side of the square target area shall be parallel to the north-south centre line of the spacing area:
  - (b) The centre of the target area shall be the common point of the four units comprising the spacing area:
  - (c) The side dimension of the target area for natural-gas wells on the surface and at any depth shall be 1,980

feet, except in the case of a well falling within the provisions of subsection (a) or (b) of section 15 (3), in which cases the target area shall be the same as the spacing area.

(3) No part of the section of a natural-gas well through the producing zone shall be nearer than 660 feet to the boundary of the spacing area upon which it is located, except

(a) where a well is classified under section 16 (2) as a wildcat well; or

(b) where a well is located in such a manner that

(i) not more than one well is completed and capable of production from the same producing zone in the spacing area; and

(ii) no part of the section thereof through the producing zone is nearer to the boundary of the title holding upon which it is located than the distance from the side of the normal target area in the spacing area to the nearest boundary of such spacing area unless contiguous title holdings have common ownership as recorded by the Department;

(iii) the sections of two producing natural-gas wells through a common producing zone shall be no nearer, one to the other, than the average east-west distance between normal target areas on laterally adjoining spacing areas at the same latitudes as each of the said two producing wells.

(4) Where a natural-gas well, other than a wildcat well, is completed outside its target area, and its location does not comply with the provisions of section 15 (3) (b), the off-target factor to be used in determining the allowable rate of production shall be the ratio of the area comprising four times the product of the shortest distances from the uppermost point of intersection of the well-bore with the productive zone to the two nearest boundaries of the normal spacing area to the area of the normal spacing area.

(5) The Chief of the Branch, at his discretion, may exempt an off-target natural-gas well from reduction of the allowable rate of production under subsection (4) if, in his opinion, the circumstances justify such exemption.



### *Wildcat Wells*

16. (1) A well, classified under section 16 (2) as a wildcat well when the drilling authority is approved, may be drilled anywhere within a normal spacing area and, if completed as a discovery oil or natural-gas well, the off-target factor to be used in determining the allowable rate of production shall be unity.

(2) A wildcat well, for the purpose of well-spacing, shall be

- (a) a well located not nearer than  $4\frac{1}{2}$  miles to a well capable of producing oil or natural gas from the zone to which the well is to be drilled; or
- (b) a well drilled to test a separate potential pool, the existence of which can be supported by adequate geological or geophysical evidence.

### *Oil or Natural-gas Wells Drilled Prior to May 2nd, 1958*

17. Where an oil well or natural-gas well has been drilled and completed under the provisions of regulations in force prior to May 2nd, 1958, the off-target factor to be used in determining the allowable rate of production shall be unity.

### *Multi-zone Spacing*

18. Whenever it has been proved to the satisfaction of the Chief of the Branch that there is more than one productive zone, he may consider the productive zones separately for the purpose of well-spacing.

### *Other than Normal Spacing*

19. Upon receipt of an application from the holder of a location overlying or that appears to overlie part of a pool, the Chief of the Branch, after an inquiry of all holders of all locations overlying the same pool, or if deemed advisable after a public hearing, may prescribe for the pool other than a normal spacing area, and in such case he shall prescribe

- (a) the target area for wells on other than normal spacing;

- (b) the off-target factor to be used in determining the allowable rates of production for wells on other than normal spacing.

### *Location of Well*

20. (1) No person shall drill or cause to be drilled a well within 250 feet of

- (a) the right-of-way or easement of any road allowance or public utility; or
- (b) a permanent building, installation, or works; or
- (c) a place of public concourse; or
- (d) a reservation for national defence,

except only where special circumstances exist that, in the opinion of an officer of the Branch, justify the granting of his written permission to drill a well at a point specified by him.

(2) Every person drilling a well at or near any aircraft runway or taxiway shall comply with the provisions of the *Aeronautical Act* and any regulation made thereunder.

### *Drilling near Mine-workings*

21. No person shall commence to drill a well within 2 miles of any sub-surface mine-workings, except with the approval of the Chief of the Branch and the Chief Inspector of Mines and in accordance with any conditions prescribed by them.

### *Notification of Commencement of Drilling*

22. An operator, commencing the drilling of a well, shall notify the Branch field office within twenty-four hours.

### *Rig Licence*

23. (1) No drilling rig or service rig shall be operated unless a rig licence has been issued and is in full force and effect.

(2) An application for a rig licence shall be submitted to the Branch on a form provided.



(3) The application shall be granted and the rig licence issued unless the Chief of the Branch, after notice to the applicant and an inquiry, finds upon sufficient evidence that the equipment is not adequate for the purpose for which it is to be used.

(4) A rig licence shall expire at midnight of the 31st day of March following the date of issue.

(5) Where, in the opinion of the Chief of the Branch, the drilling rig or service rig is being operated in such manner as to contravene the provisions of the Act, of the regulation, or of an order of the Branch made according to either of them and thereby creates a menace to oil, natural-gas, or water-bearing formations, or to life or property, the Chief of the Branch may cancel the rig licence.

(6) The rig licence shall be displayed prominently at the well-site during drilling operations.

#### *Drilling Authority*

24. (1) No person shall commence the drilling of a well or continue drilling operations unless a drilling authority has been issued and is in full force and effect.

(2) Notwithstanding subsection (1), the site for a well may be surveyed, land cleared and levelled, access roadways constructed, and the rig erected before a drilling authority has been issued.

(3) No well shall be drilled elsewhere than at the location specified in the drilling authority or, if the drilling authority has been amended with respect to the location of the well, at the location specified in the amendment.

(4) If drilling is not commenced within ninety days of issuance of a drilling authority, the drilling authority may be cancelled, and another application for a drilling authority will be required for approval by the Branch.

(5) A drilling authority may be cancelled upon the request of an operator.

(6) A drilling authority may be cancelled by the Chief of the Branch if the operator fails to comply with the provisions of the regulation.

#### *Application for Drilling Authority*

25. (1) An application for a drilling authority shall be submitted to the Branch on a form provided.

(2) An application shall be accompanied by a fee of \$50.

(3) The applicant for a drilling authority shall set out in the application and in the manner required

(a) the name proposed for the well, which shall not duplicate any previously recorded name or be of a misleading nature;

(b) the proposed programme of drilling operations;

(c) whether the well-site is located on Crown or alienated land;

(d) such other information as an officer of the Branch may require;

(e) an original plan on tracing-linen plus two paper prints of the site of the well to be drilled, the survey of which was made by a British Columbia Land Surveyor. The plan shall bear the affidavit of the surveyor in the form shown in section 5.17 of B.C. Regulation 301/59 and shall faithfully represent a survey made to a maximum linear error of closure of 1 part in 2,500 parts, and shall be called a final survey, which shall show

(i) the commencement and the closing point to be a monument or monuments of the township system in the Peace River Block, or of the township or other cadastral system in the Lower Fraser Valley, a Government triangulation station or stations, monuments which have been established under this section, or Provincial boundary or highway right-of-way monuments which have been co-ordinated on geodetic datum and are acceptable to the Surveyor-General. The basis for acceptability of any commencement or closing point will be that it is one on a closed survey based on geodetic datum and capable of being co-ordinated with an accuracy of 1 in 2,500. Where the same monument is used for starting and closing the survey, and where a traversing procedure is used, distances of the traverse shall be chained and reverse



chained as two independent operations. Any surveys for well-site location purposes carried out prior to this regulation may be used as commencing or closing points subject to review and acceptance by the Surveyor-General;

(ii) bearings which have been derived from stellar observations taken near the origin of the survey, at 5-mile intervals or at least once every forty angles of traverse and at the conclusion of the survey, or from the bearings of the triangulation network, if a check can be obtained;

(iii) the survey relationship of the well-site to the nearest corner of the spacing area in which it is located;

(iv) the distance of the well-site to natural-gas wells capable of production according to Departmental records and located within the spacing area or within a contiguous spacing area;

(v) the latitude and longitude of the well-site if outside the areas known as the Peace River Block and the Lower Fraser Valley (O.C. 3025/57);

(vi) the horizontal distances and bearings on the quadrantal system (e.g., N.  $26^{\circ} 31'$  E.) of all traverse or other lines run;

(vii) full information regarding old posts found or new posts set, as well as full details of all reference marks found and made;

(viii) the designation of the land through which the traverse passes (i.e., lot or section number, unsurveyed Crown land, etc.);

(ix) any topographical features or offset distances to improvements shall be shown where practicable or relevant;

(x) a traverse table and a plane-co-ordinate list of each traverse station, well-site, and all monuments or reference monuments set, as well as the triangulation or other control station or stations used. The traverse table shall show the closure obtained and

shall be balanced in red ink. Horizontal distances shall be reduced to sea-level. The origin of co-ordinates shall be an adjoining whole degree of latitude and an odd-numbered meridian of longitude (e.g.,  $55^{\circ} 00' - 123^{\circ} 00'$  or  $56^{\circ} 00' - 125^{\circ} 00'$ , etc.), and the bearings shall be referred to this meridian of origin and shall be clearly stated on the plan;

(xi) in addition to the well-name, the National Topographic Series map-sheet where applicable, the scale employed, the north point, and the land district;

(xii) an accurate plot in black ink of the traverse and well-site to a reasonable scale and, if necessary for clarity, an inset map to a scale of 400 feet to 1 inch of the well-site area;

(xiii) printing by hand or mechanical printing device of all details required, with only the necessary signatures written;

(xiv) symbols and abbreviations used on the plan in accordance with the legend given in section 5.14 of B.C. Regulation 301/59, except that black ink shall be used for all symbols;

(f) after examination and acceptance of the survey as represented by the plan, the Surveyor-General shall approve same by a suitable notation on the plan;

(g) the survey shall be carefully referenced by the use of permanent survey monuments of Type 1, 2, or 4 (except as in (iv) below), and the general requirements of B.C. Regulation 300/59 (sections 1.04 and 1.05) for the setting and marking of these shall apply, except that in lieu of boundary-lines the surveyor shall stamp the letters "P.N.G." followed by the numerical portion of the well-name. The National Topographic Series map-sheet number must be added if the location is outside the Peace River Block or the Lower Fraser Valley area. Monumentation shall further require that

(i) the drilling-site shall be referenced by two intervisible survey monuments, at least 500 feet apart



and placed in anticipation of future clearing of the site. Where a traverse survey is made, it shall also be referenced by setting survey monuments, in inter-visible pairs at least 500 feet apart, every 4 miles. These posts shall be stamped with the commissioned number of the surveyor, the year, and the number of the traverse station;

(ii) the position of every post shall be referenced by at least three bearing-trees, wherever trees are available. The distance to each bearing-tree shall be measured in feet and tenths, from a point 4 feet vertically above the top of the post to the face of the blaze. The bearing-tree shall be carved with the letters "B.T." and the distance to the post, although when the trees are frozen this information may be stamped on a substantial aluminum tag and fastened securely to a properly blazed face of the bearing-tree. The magnetic bearing from the post to the tree shall be recorded together with the diameter and species of the tree;

(iii) a wooden post shall be set to indicate the position of a standard post which is not referenced by cairn, earth mound, or trench. This wooden post shall be of triangular cross-section, not less than 3 inches wide on any face, firmly set to stand at least 30 inches high and carved "Mon" on the side facing the standard post. The post shall be pointed at the top to shed water and covered with red or orange plastic tape or paint;

(iv) when the ground is frozen the old-pattern D.L.S. iron post, 30 inches long, which can be driven, may be used as an alternative type of survey monument. In this case the stamping, described in section 25 (3) (g), may be made on a durable tag and attached to the post or a bearing-tree. Similarly, in lieu of the normal wooden reference post a tripod covered with cotton or other material may be used;

(h) notwithstanding the provisions of section 25 (3) (e) requiring a final survey, an operator, subject to the approval of the Chief of the Branch, may commence to drill a well, provided that a preliminary survey has been made and submitted with the application for a drilling authority. In the case of a well classified as other than a wildcat well, a preliminary survey shall consist of geographic co-ordinates of the proposed well-site within an accuracy of 100 feet of the stated position and always within the allowable target area. In the case of a well classified as a wildcat well, a preliminary survey need consist only of an air photo or other location which would definitely identify the well position within a particular quarter-unit. Preliminary surveys may be made by a British Columbia Land Surveyor, or other engineer or surveyor satisfactory to the Surveyor-General;

(i) in all cases where the site of a well classified as other than a wildcat well has been established by a preliminary survey, a final survey shall be filed within thirty days after commencement of drilling in accordance with section 25 (3) (e) of this regulation;

(j) in all cases where the site of a well classified as a wildcat well has been established by a preliminary survey, a final survey shall be filed within thirty days after completion of the drilling, except where the well has been abandoned no final survey shall be required;

(k) in certain cases where the use of special methods of survey are desirable and the required precision can be met, they may be allowed, subject to the prior approval of the Surveyor-General;

(l) the location of a well as determined by the final survey shall be the official location of the well;

(m) the survey requirements shall take effect thirty days after the publication of this regulation.

26. No change shall be made to the programme of drilling operations approved under the drilling authority, unless an application to amend the drilling authority has been sub-



mitted to the Branch, on a form provided, and has been approved by an officer of the Branch.

#### *Notice to Be Posted*

27. The drilling authority and any amendments shall be displayed prominently at the well-site during drilling operations.

#### *Drilling Deposit*

28. (1) Application for a drilling authority shall be accompanied by a deposit, payable in cash or acceptable government bonds, as security for the proper control, completion, suspension, or abandonment of the well in full compliance with the provisions of this regulation.

(2) The amount of the deposit shall be \$2,500, or such greater amount as may be required by the Chief of the Branch where, in his opinion, special circumstances exist.

(3) If the application is not approved, the deposit shall be returned to the applicant.

(4) Upon the completion or abandonment of a well in strict accordance with the provisions of this regulation, the deposit or, where the Branch has performed the required work, any unused portion thereof shall be returned to the operator.

(5) If the same person applies to drill more than one well or subsequently applies to drill another well or wells, an amount of not less than \$2,500 may be fixed by the Chief of the Branch as the total deposit required, and the amount so fixed may be changed by him upon any subsequent application.

(6) Where any well is a menace to oil, natural-gas, or water-bearing formations, or to life or property, and if remedial measures are considered necessary and the operator of the well fails to use such measures as directed by an officer of the Branch, the Chief of the Branch, at the expense of the operator, shall take such steps and employ such persons as may be necessary to carry out the remedial measures, and for that purpose

(a) may enter upon, seize, and take possession of any such well, together with the whole or part of the movable and immovable property in, on, or about the well or used in connection therewith or appertaining thereto;

(b) may take over the management and control thereof for the time necessary to carry out the remedial measures; and

(c) may use all or any part of the deposit to defray the costs incurred by the Crown under this subsection.

(7) If the costs incurred by the Crown under the provisions of subsection (6) exceed the deposit held, the difference shall be a debt payable by the operator of the well to the Crown in right of the Province.

(8) The return of a deposit or any unused part thereof does not relieve the operator or reduce his liability under this section.

#### *Application to Alter a Well*

29. (1) Until an application to alter a well, on a form provided, has been approved by an officer of the Branch, no person shall commence to

(a) deepen a well beyond the formation from which production is being taken or has been taken; or

(b) recomplete a well by perforating any casing with a view to producing from any formation other than that from which production is being taken or has been taken; or

(c) suspend normal drilling operations; or

(d) suspend normal producing operations for a period longer than three consecutive months; or

(e) resume drilling operations after a previous completion, suspension, or abandonment of a well; or

(f) resume producing operations after a previous suspension; or

(g) rework a well to alter the producing characteristics of the well.

(2) The application required under subsection (1) shall set forth the present condition of the well, the programme of



operations to be undertaken, and such other information as the Chief of the Branch may require.

(3) (a) No programme or operations of the nature described in subsection (1) shall be commenced unless the Branch field office has been notified or without the approval in writing of an officer of the Branch; however, such approval may first be given orally.

(b) Where operations at a well have been suspended with the approval of an officer of the Branch and are not resumed within one year from the date of such approval or within such other time as an officer of the Branch may have set out in the approval, the operator may apply to the Chief of the Branch for an extension of the time of suspension, giving the reasons therefor, and the Chief of the Branch, at his discretion, may refuse the application or grant it in whole or in part.

(c) In considering an application for an extension of the time of suspension, the Chief of the Branch may have regard to

(i) whether an economic market is available for the oil or natural gas that can be produced from the well; and

(ii) whether the well is in a safe condition.

(d) In the absence of an application by an operator for an extension of time of suspension or where, in the opinion of the Chief of the Branch, suspension of normal drilling or normal producing operations has occurred without his approval, the Chief of the Branch may direct the operator to abandon the well or resume operations, in accordance with his instructions, and the operator shall forthwith comply with the directions.

#### *Well Signs*

30. The operator shall, on each rig, derrick, well, and tank battery, display and maintain a legible conspicuous sign showing the name of the operator, the name of the well, and the legal description of the well location.

#### *Official Well Names*

31. (1) The Branch shall maintain a record of official well names, to be known as the "Well-names Register," in which shall be entered with respect to each well

(a) the name and location of the well; and

(b) the name of the operator and his agent; and

(c) the name of the drilling contractor.

(2) The Chief of the Branch may limit the length and the terms which may be included in a well name.

#### *Change of Well Name*

32. (1) An application to change a well name shall be submitted to the Branch on a form provided.

(2) An application, initiated by an operator, shall be accompanied by a fee of \$25.

#### *Service of Notice*

33. (1) Every operator of a well and agent for the operator shall register an address with the Branch.

(2) All notices or orders issued under authority of this regulation shall be deemed to have been served upon an operator or his agent upon delivery thereof at his registered address or, if sent by mail, upon the expiration of the time it would normally take for delivery.

#### *Equipment, Casing, and Tubing*

34. (1) All equipment, casing, or tubing used by the operator in the drilling or production of any well shall be in good condition, and shall be adequate for the purpose for which it is used.

(2) Where it appears to an officer of the Branch that any equipment, casing, or tubing used in the drilling or production of a well is inadequate, defective, or hazardous, the officer may require the replacement or reconditioning of such equipment, casing, or tubing and may order orally, confirmed by a signed note on the daily drilling report, that operations be discontinued in whole or in part until the required action is taken.



### *Casing*

35. Unless special instructions apply,

- (1) sufficient surface casing of suitable size shall be run in all wells through all unconsolidated deposits and shall be cemented into a competent formation by an approved method in accordance with good oilfield practice with sufficient cement to fill the annulus to the surface;
- (2) cement shall be allowed to set not less than twelve hours under pressure before the cement plug is drilled out of the casing;
- (3) if a float collar or float shoe is used, pressure at the surface may be released immediately upon completion of the cement job;
- (4) intermediate and production casing shall be cemented and tested by approved methods in accordance with good oilfield practice, and the cement shall be allowed to set at least twenty-four hours before the cement plug is drilled out of the casing;
- (5) where there is any reason to doubt the effectiveness of a casing cementation, a survey shall be made to determine the top of the cement in the annulus;
- (6) every casing programme other than that specified by the drilling authority must be approved by an officer of the Branch before the casing is run.

### *Blowout Prevention*

36. (1) The operator of a well which is being drilled, tested, completed, or reconditioned shall at all times maintain blowout-prevention equipment that is adequate, having regard to the depth to be drilled, the expected pressures, and the necessity, in the case of a blowout, of obtaining a shut-off of the open hole or around drill-pipe, casing, or tubing.

(2) The assembly shall contain two lines below the blowout-preventers for the purpose of bleeding off fluids and killing the well, and the lines shall be of a minimum diameter of 2 inches and shall be equipped with high-pressure valves and fittings and adequately anchored; provided, however, that

where prevention equipment in addition to that required by subsection (1) is installed, it may be below such lines.

(3) A valve shall be installed in the Kelly assembly that is adequate to shut off flow through the drill-pipe, and the positive operation of the valve shall be checked daily and the results shall be recorded in the daily drilling reports.

(4) In addition to hydraulic controls, blowout-preventers shall be equipped with manual controls which shall be located outside the rig substructure.

(5) For hydraulic equipment, only the fluid recommended by the manufacturer of the equipment or a fluid of equivalent specifications shall be used.

(6) Prior to drilling out of the surface casing or an intermediate casing, the operator shall test each unit of the blowout-prevention equipment under a constant pressure of at least 1,000 pounds per square inch for a minimum period of five minutes and shall not proceed until the blowout-prevention equipment is found serviceable.

(7) While a well is being drilled, the operation of the blowout-prevention equipment shall be checked daily, and if found to be defective the equipment shall be made serviceable before drilling is resumed.

(8) All pressure tests and mechanical tests shall be reported by the operator in the daily drilling report book with full particulars, including pressures, time, and results.

(9) The operator shall record on the daily drilling report every closing of a blowout-preventer and the reason therefor.

(10) During winter operations the operator shall ensure that the serviceability of blowout-prevention equipment will not be impaired through freezing.

(11) Each person employed on the rig shall have an adequate understanding of and be able to operate the blowout-prevention system, and new employees shall be trained in the operation of the system as soon as it is practicable to do so.

(12) The Chief of the Branch may prescribe types of blowout-prevention equipment that will be deemed adequate and may stipulate the condition under which the prescribed equipment is deemed adequate.



### *Surface and Sub-surface Equipment*

37. (1) The surface and sub-surface equipment of a completed oil or natural-gas well shall be of such nature and so arranged as to permit the ready measurement by an officer of the Branch of the tubing pressure, production-casing pressure, surface-casing pressure, and the bottom-hole pressure, and to permit any other reasonable test required by the Branch, except in so far as a completion practice approved by an officer of the Branch precluded such measurement or test.

(2) (a) The sub-surface equipment shall include, unless otherwise approved by an officer of the Branch, a bar-collar or the equivalent, at the lower end of the production string or tubing, as a safeguard against loss of testing equipment.

(b) Notwithstanding the approval under subsection (2) (a), where a bar-collar or the equivalent has not been installed by the operator of a well, the operator will be held responsible for reimbursing the Department for any losses of its equipment run into the well.

(3) The surface equipment shall include such valve connections as are necessary to sample the oil, natural gas, or water produced.

(4) The operator of an oil or natural-gas well shall keep an accurate detailed record of all sub-surface equipment in the well, at all times prior to abandonment, and the record shall be available to any officer of the Branch upon request.

### *Variation of Programme*

38. (1) No departure from or variation in any programme of operations approved or prescribed under this regulation shall be made, unless such departure or variation has been approved by the Chief of the Branch in writing.

(2) In case of an emergency, when an immediate departure from or variation in the programme is necessary, the operator shall advise the Branch immediately by telegraph or telephone and shall confirm in writing such departure or variation.

### *Sealing off Oil, Natural Gas, and Water*

39. (1) Unless approval has been obtained from an officer of the Branch, no well shall be drilled beyond any oil, natural-gas, or water stratum until the oil, natural gas, or water in such stratum is sealed off by mud-laden fluid, if considered adequate by the officer, or by casing, cement, or both.

(2) Where it appears to an officer of the Branch that a shut-off of oil, natural gas, or water in a well is not effective, he may order tests to be made and remedial measures to be taken.

### *Test of Water Shut-off*

40. The method and duration of a water shut-off test shall be as prescribed or approved by the Chief of the Branch.

### *Samples and Cores*

41. (1) Unless otherwise directed by an officer of the Branch, each operator shall cause to be taken and preserved a series of samples, taken at depth intervals of 10 feet, of the various formations which any drilling penetrates, and the samples shall be washed, dried, and preserved in bags tied in groups of ten consecutive samples, each bag being accurately labelled with the name of the well, depth interval, date of sample, and the samples shall be forwarded by the operator, carriage prepaid, in accordance with any instructions which may be issued by an officer of the Branch.

(2) All cores taken from the core-barrel shall be retained in book fashion in wooden core-boxes, accurately labelled on the body, not the lid, of each box with the number and interval of the core, top, bottom, and percentage recovery of the core, and the name of the well from which the core was taken.

(3) Core-boxes shall be of adequate construction; the sides of the boxes shall project above the level of the contained cores, and lids shall be securely fixed to ensure safe transit; and such boxes shall not exceed 30 inches in length.

(4) Reasonable steps shall be taken by the operator to protect boxes containing the cores from theft, misplacement,



or exposure to the weather, and, after reasonable time has been afforded the operator to carry out examination and obtain analyses of them, he shall forward them, carriage prepaid, to the Branch when so directed.

(5) Unless the Chief of the Branch otherwise approves,

(a) no cores shall be destroyed; and

(b) no cores shall be slabbled or otherwise sampled; and

(c) no cores shall be taken out of British Columbia, except such portion thereof as is reasonably necessary for analytical purposes, and where possible, following analysis, these shall be returned.

(6) Every operator shall advise an officer of the Branch of the interval over which a core was taken, and he shall submit, in duplicate, within thirty days of the completion of the analysis, any analysis made therefrom.

(7) The operator of a well being drilled for oil or natural gas, immediately upon encountering a geological zone or formation from which production of oil or natural gas may be anticipated, when requested by an officer of the Branch, shall core and adequately test such zone or formation, and the information so obtained shall be forwarded to the Branch by the most expeditious method.

(8) Upon receipt of the information referred to in subsection (7), the Chief of the Branch, at his discretion, may order that no further drilling shall be done.

#### *Notification of Oil, Natural Gas, or Water Encountered*

42. When an operator encounters significant quantities of oil or natural gas or water in a well not in a recognized field or, if in a recognized field, in a stratum not before productive in that field, he shall

(1) notify the Branch, by the most expeditious method, of the character, extent, and quantity of oil or natural gas encountered;

(2) with respect to all oil, natural gas, or water encountered,

(a) record on a sample information sheet, acceptable to the Chief of the Branch, all pertinent data; and

(b) cause a sample to be analysed and send forthwith two copies of the analyst's report together with the sample information sheet to the Branch; or,

(c) if he does not wish to have an analysis made, he shall submit the sample information sheet and the sample, carriage prepaid, in accordance with instructions issued by an officer of the Branch.

#### *Provision before Completion*

43. When, during the drilling of a well, it is expected that oil or natural gas will be encountered, the operator shall make preparations for their conservation before a well is completed, and make adequate provision for production and storage facilities before the well is placed on production.

#### *Uncontrolled Flow*

44. The operator shall take all precautions necessary to prevent his well from flowing uncontrolled.

#### *Report of Uncontrolled Flow*

45. Every operator shall immediately report to an officer of the Branch, and confirm by letter, any well flowing uncontrolled.

#### *Daily Reports*

46. (1) A daily report, on a form approved by an officer of the Branch, shall be kept by the operator at the site of a well being drilled or reconditioned.

(2) The operator of the well shall submit to the Branch within the next ensuing week legible copies of the daily reports for each calendar week and shall retain copies as part of his permanent record.

(3) Any suspension of operations and the rig release date shall be noted on the last daily report submitted prior to suspension or completion.

(4) The daily report shall set out complete data on all operations performed during the day, and shall include

(a) depth at the beginning of and end of each tour;



- (b) formations penetrated;
  - (c) any change in casing;
  - (d) when casing is set, all data regarding setting, together with the size, type, grade, and weight of casing, whether new or used, and the depth at which it is set;
  - (e) particulars of cementing;
  - (f) any water, oil, or natural gas encountered, even if only small showings;
  - (g) a report of any deviation or other tests made;
  - (h) full details of all formation tests, except where the details are submitted on a confidential report form provided by the Branch;
  - (i) all occasions when the blowout-preventers are closed, with the reason therefor;
  - (j) any loss of drilling-fluid into the formation; and
  - (k) allocation of time to each operation.
- (5) Reports shall be submitted not only on drilling operations, but on all operations carried out, such as fishing, shooting, perforating, acidizing, surveying, suspending, plugging, or abandoning.

#### *Submission of Information*

47. The operator shall submit all information connected with or derived from the drilling and production of his wells that the Chief of the Branch or person designated by him may from time to time require and, when so prescribed, on forms provided by the Branch.

#### *Well Completion Reports*

48. (1) Within thirty days after completion, abandonment, or suspension of a well drilled for oil or natural gas, the operator shall submit to the Branch, on a form provided, a signed Well Completion Report, and shall attach drill-stem test service reports together with the pressure charts.

(2) If the initial completion or abandonment of a well is not carried out within thirty days of the release of the drilling rig or where a well is subsequently deepened, a signed supplemental Well Completion Report providing details of the operation shall be submitted to the Branch.

#### *Well History Reports*

49. (1) Within sixty days of the completion or abandonment of an exploratory well, the operator shall submit a Well History Report, and where an exploratory well is subsequently deepened, he shall submit a supplemental Well History Report, but logs, core analyses, or other records which have been submitted previously need not be included but shall be listed in the index.

(2) The Well History Report shall be compiled in accordance with the instructions issued by the Branch.

#### *Work-over Reports*

50. (1) The operator shall submit a Work-over Report, on a form provided, within thirty days of the completion of any work-over which has changed the producing interval, or has altered or was intended to alter the producing characteristics of a well.

(2) Where more than one work-over has been performed on a well, the Work-over Reports shall be numbered consecutively.

#### *Release of Information*

51. (1) The following information obtained from the operator and recorded with the Branch shall be held confidential at all times:—

- (a) All operator's pool studies and reserve estimates unless filed at an inquiry or a public hearing;
- (b) All information submitted to the Branch not required by regulation and obtained at extra expense to the operator and requested to be held confidential;
- (c) Calculations of maximum permissible rates made by the Branch for individual wells, pools, or fields;
- (d) Daily production rate;
- (e) Individual pipe-line, refinery, and gas-plant operational data, if more than one pipe-line, refinery, or gas plant is involved;
- (f) Secondary recovery and water-disposal data for individual systems;
- (g) Battery test data.



(2) All static, flowing, and special bottom-hole pressure data obtained from tests made by an officer of the Branch may be held confidential to the Branch, and the release of such data, or any part of it, shall be at the discretion of the Chief of the Branch.

(3) The following information obtained by the operator and recorded with the Branch shall be held confidential for one year from the date of release of the drilling rig by the operator of the well, or from the date of testing, if the well has been declared a deep pool test by the Branch or is not within a designated field before the year expires:—

- (a) Connate water determinations and other liquid saturation measurements:
- (b) All drill-stem test data:
- (c) All natural-gas, oil, and water analyses:
- (d) Static top-hole and bottom-hole pressure data submitted to the Branch by the operator:
- (e) Flowing and other special bottom-hole pressure data submitted to the Branch by the operator:
- (f) Back-pressure data and results obtained from tests made by an operator or an officer of the Branch:
- (g) Perforations, well treatments, cored intervals, and abandonment details:
- (h) Logs, including sonic logs, and information derived from logs:
- (i) Geological markers determined by the Branch:
- (j) Information from well sample cuttings and cores preserved by the Branch:
- (k) Maximum permissible rates.

(4) All core analyses and information derived from core analyses shall be held confidential for one year from the date of release of the drilling rig by the operator of the well.

(5) The following information obtained from the operator and recorded with the Branch shall be held confidential for thirty days from the date of release of the drilling rig by the operator of a well, if the well has not been declared a deep pool test by the Branch or is within a designated field before

the year expires, provided one year has expired from the completion date for the discovery well:—

- (a) Connate water determinations and other liquid saturation measurements:
- (b) All drill-stem test data:
- (c) All natural-gas, oil, and water analyses:
- (d) Static top-hole and bottom-hole pressure data submitted to the Branch by the operator:
- (e) Flowing and other special bottom-hole pressure data submitted to the Branch by the operator:
- (f) Back-pressure data and results obtained from tests made by an operator or an officer of the Branch:
- (g) Perforations, well treatments, cored intervals, and abandonment details:
- (h) Logs, including sonic logs, and information derived from logs:
- (i) Geological markers determined by the Branch:
- (j) Information from well sample cuttings and cores preserved by the Branch:
- (k) Maximum permissible rates.

(6) The following information obtained from the operator and recorded with the Branch shall be open to the public at all times:—

- (a) Location, elevation, current depth, casing, and cementing data and status of all wells:
- (b) All applications and submissions made to the Minister, the Branch, or the Conservation Committee for the purpose of a public hearing:
- (c) Monthly production figures for all wells.

(7) Any information obtained from the operator and recorded with the Branch may be released at any time with the written consent of the operator.

(8) Where a well is drilled on the location specified in a permit and the permit is surrendered without the operator having selected a lease or leases from the location, then, notwithstanding subsections (2) and (3), the information submitted in connection therewith may be released at any time.



(9) Notwithstanding any restrictions placed upon the release of information by this regulation, any information may be released by the Lieutenant-Governor in Council at any time when he considers it in the public interest to do so.

(10) (a) For the purpose of this regulation, completion date shall mean the date of release of the drilling rig by the operator, which shall be confirmed by a signed note on the daily drilling report.

(b) Where a well has been suspended for more than one year, the completion date is the date of suspension.

(11) All confidential information mentioned in this section may be made available to regulatory bodies of the other Provinces and of Canada, provided adequate assurance is given that such information shall be kept confidential to and by the body to which it is given.

#### *Formation Evaluation Tests*

52. (1) The operator shall, before a well is completed or abandoned, cause an electrical log to be taken with all pertinent data recorded on it, unless permission is obtained from an officer of the Branch to dispense with the electrical log or to substitute a different type log for the electrical log.

(2) When so directed by an officer of the Branch, the operator shall take any other log or make any other well survey that is generally recognized and is in practical use in the industry for obtaining information pertinent to the well.

(3) The operator, with approval of an officer of the Branch, may substitute another type of log or core for the electrical log either throughout the well or through specified sections of the well.

(4) Two copies of each log shall be submitted to the Branch within thirty days of the date upon which the log was taken.

53. (1) The operator, unless otherwise directed by an officer of the Branch, shall take or cause to be taken deviation readings, as the well is drilled, at intervals not exceeding 500 feet from the top to the bottom of the well, or at such lesser intervals as an officer of the Branch may require, for the purpose of ascertaining the extent that the well deviates from

the vertical and shall report the results on the daily drilling reports.

(2) Whenever required to do so by an officer of the Branch, the operator shall make a directional survey of the well.

(3) In the event of failure to take the deviation readings or to make the surveys required by this regulation, an officer of the Branch may order that no further drilling be done and, if the well has been placed on production, that no further production be taken until such survey is made.

(4) The operator, within thirty days after making a directional survey, shall submit to the Branch a written report of the results and shall include a true copy of the survey report.

(5) An officer of the Branch, when instructed by the Chief of the Branch, may order the operator to make such further surveys as he deems necessary and may give directions as to the manner in which such surveys shall be made.

(6) Where deviation readings or directional surveys show that a well has been drilled in contravention of this regulation, the Chief of the Branch may require the operator to redrill the well, wholly or partly, directionally, or in any such other manner as he may prescribe, or the operator may, at his option, abandon the well.

#### *Shooting, Perforating, Chemical Treatment*

54. (1) The operator shall not shoot a well with nitroglycerine or similar type of explosive until the Branch has been notified of the contemplated action and approval of an officer of the Branch obtained.

(2) All reasonable precautions shall be taken when shooting, perforating, or chemically treating a well to ensure that no irreparable damage is done to the well or to productive formations.

(3) Where any damage is done to a well or to a formation by shooting, perforating, or chemical treatment, the operator may repair or abandon the well, but, in so doing, he shall take every precaution to prevent waste of oil or natural gas or damage to persons or property.



### *Fire Precautions*

55. (1) No person shall smoke within 100 feet of any receptacle used by an operator for storage, measurement, or separation of oil or natural-gas products, or within 75 feet of any well drilling below the shoe of the surface casing.

(2) Failure of an operator to enforce the provisions of this section shall be a contravention of the regulation.

### *Motors*

56. (1) On all internal-combustion engines within 75 feet of any well, separator, crude-oil storage-tank, or other unprotected source of ignitable vapours,

(a) the exhaust-pipes shall be insulated or sufficiently cooled, in a manner deemed adequate by an officer of the Branch, to prevent ignition of inflammable material, and the ends thereof directed away from the well-head or source of ignitable vapours; and

(b) the exhaust manifolds shall be shielded to prevent their contact with liquids or gases which might otherwise fall thereon.

(2) All diesel motors located within 75 feet of any well shall be provided with either an approved type of air intake shut-off valve with a readily accessible control or a suitable duct so that the air for the motors is obtained at least 75 feet from the well.

### *Fuel Storage*

57. Except for the fuel-tanks actually connected to operating equipment, no person shall store gasoline or liquid fuel within 75 feet of a well, and drainage from places of storage of gasoline or liquid fuel shall be in a direction away from the location of the well.

### *Heating or Lighting Apparatus*

58. No heating or lighting apparatus involving the use of a flame shall be allowed within 150 feet of a well.

### *Fire-extinguishers*

59. (1) At each drilling rig there shall be not less than two 20-pound dry-powder fire-extinguishers, and at each boiler-house there shall be not less than two 5-gallon non-freeze-type fire-extinguishers or two 20-pound dry-powder fire-extinguishers, all of which shall be kept in good working condition.

(2) When a steam-pressure of 100 pounds or more is used on or about a rig, there shall be placed on the derrick floor a steam-hose of a diameter of not less than 1 inch and not less than 20 feet long securely connected to a steam-line, with a valve situated close to the end thereof.

### *Drill-stem Tests*

60. (1) When, in the opinion of an officer of the Branch, a rig is inadequately lighted by natural light, no drill-pipe shall be disconnected during a drill-stem test if, in the opinion of the officer of the Branch, there is a possibility of any oil or natural gas being present in the drill-pipe.

(2) When oil or natural gas has been recovered during a drill-stem test, the drill-pipe shall not be pulled during hours of darkness, unless positive steps have been taken to ensure that there is no possibility of oil or natural gas being present in the pipe.

(3) All flare lines shall be securely anchored.

### *Electrical Installations*

61. (1) All electrical installations at or near any drilling rig, well, separator, crude-oil storage-tank, or other unprotected source of ignitable vapours shall be in accordance with the standards prescribed by the Canadian Electrical Code, except where those standards do not conform with the provisions of this regulation.

(2) Instruments requiring electrical power shall not be located in areas where ignitable vapours may be present, unless approved by the Electrical Inspector of the Department of Mines and Petroleum Resources.



## Grounding

62. (1) Grounding electrodes shall consist of driven rods, or pipes, or buried metal plates, or other means acceptable for the purpose, and shall have a ground contact resistance of not more than 6 ohms.

(2) In grounding drilling and service rigs, the grounding electrode shall be provided at the generator and shall be connected to the neutral point of the system before energy is supplied to any equipment or apparatus therewith.

(3) Upon the erection of the rig substructure, bonding from the metal structure to the neutral point of the system at the generator shall be provided in one of the following ways:—

(a) A continuous metal raceway enclosing the circuit conductors to the derrick substructure:

(b) A separate grounding conductor installed as part of the cable assembly to the derrick substructure:

(c) A grounding conductor of at least No. 8 A.W.G. run separately.

(4) The non-current-carrying parts of the electrical equipment shall be bonded at the neutral point of the system at the generator or at the supply-service location by one of the means outlined in subsection (3).

(5) In no case shall the neutral conductor of supply circuits be used for bonding of non-current-carrying metal parts of equipment.

(6) (a) The neutral bar in the distribution panel on the derrick substructure shall be insulated from the panel frame.

(b) The panel frame shall be bonded either by direct mounting on the rig structure or by one of the means outlined in subsection (3).

(7) The metallic parts of containers or conveyers of flammable liquids shall be bonded and grounded to prevent the development of static electric sparks.

## Lighting and Power Installations

63. (1) In lighting installations in any area of operations under this regulation,

(a) all wiring shall be in

(i) rigid threaded conduit with threaded vapor-proof fittings; or

(ii) assemblies of Type S cable with vapour-proof fittings, if approved by the Electrical Inspector of the Department of Mines and Petroleum Resources;

(b) all lighting fixtures, switch-gear, and overcurrent protective devices installed within 25 feet of a well-bore shall be in vapour-proof enclosures with all conductor raceways properly sealed;

(c) all extension cords shall be so connected that accidental disconnection is impossible, and when cord receptacles of the lock and switch type are not provided, instructions shall be issued to turn off the current before connecting or disconnecting extension cords;

(d) all lamps shall be provided with guards approved by the Electrical Inspector of the Department of Mines and Petroleum Resources;

(e) the entire installation shall be properly maintained at all times.

(2) In power installations in any area of operations under this regulation,

(a) all wiring shall be in

(i) rigid threaded conduit or lead-covered armoured cable; or

(ii) assemblies of Type S cable with vapour-proof fittings, if approved by the Electrical Inspector of the Department of Mines and Petroleum Resources;

(b) all switch-gear, overload and overcurrent protective devices located within 25 feet of a well-bore shall be in vapour-proof enclosures with all conductor raceways properly sealed;

(c) no electrical generator or electrical heater with exposed elements shall be placed within 75 feet of any well, separator, crude-oil storage-tank, or other source of ignitable vapours;



- (d) all electrical motors located within 25 feet of a well-bore and those operating shale-shakers shall be either the totally enclosed polyphase type or those approved for Class I, Group D areas;
- (e) all switch-gear and motors located in areas where ignitable vapours may accumulate shall be approved for Class I, Group D areas.

#### *Pump Installations*

64. (1) Where a power-line of less than 750 volts between conductors is adjacent to an oil or gas well, the horizontal clearance from the pole-line to the well shall be as specified in one of the following:—

- (a) Where the overhead power-line is in line with a well, the clearance between the dead-end structure and the well shall be a minimum of 20 feet;
  - (b) Where the overhead line passes by a well, the horizontal clearance between the line and the well, measured at right angle to the line, shall be a minimum of 75 feet, except that this clearance may be reduced to
    - (i) not less than 20 feet plus the ground clearance of the line when permission to do so is obtained from the Electrical Inspector of the Department of Mines and Petroleum Resources; or
    - (ii) where the distance is not obtainable, and when permission is obtained from the Electrical Inspector of the Department of Mines and Petroleum Resources, the horizontal clearance may be reduced to 20 feet provided the line is guyed away from the well;
  - (c) In all other cases the horizontal clearance between any part of a pumping structure and the power-line shall be such that if the power-line should fall toward a pumping structure, no energized conductor will fall within 20 feet of the structure.
- (2) Where a power-line of 750 volts or more between conductors is adjacent to an oil or gas well, the horizontal

clearance between the power-line and the well, measured at right angle to the line, shall be a minimum of 75 feet.

(3) Wiring of equipment such as pressure switches, which is frequently moved or disconnected for well-servicing operations, shall be connected by means of Type S or equivalent flexible cord of as short a length as is practicable. A ready means of connection and disconnection of flexible cords shall be provided by the use of cord connectors or fittings approved for the location.

(4) Control equipment shall be substantially supported independently of the conduit.

(5) Where wiring is installed in other than rigid conduit, adequate protection from mechanical damage shall be provided.

(6) A warning sign must be posted on pumps which are automatically controlled with wording similar to the following:—

#### **WARNING**

This equipment is automatically controlled and the main switch must be disconnected before work is done on the equipment.

#### *Battery Installations*

65. (1) Areas within buildings or housings enclosing treaters, separators, manifolds, or other equipment which may result in hazardous concentrations of flammable gases or vapours continuously, intermittently, or periodically, under normal operating conditions, shall be considered as Class I, Division I hazardous locations.

(2) Outdoor areas within 10 feet of the outer confines of buildings or housings in which the conditions outlined in subsection (1) may exist shall be considered as Class I, Division II hazardous locations.

(3) Outdoor areas more than 10 feet from, but within 25 feet of, the outer confines of buildings or housings in which the conditions in subsection (1) may exist shall be considered as Class I, Division II locations to a point 2 feet above grade.

(4) Totally enclosed gasketed equipment with threaded hubs shall be used in areas more than 10 feet from, but within 25 feet of, the outer confines of buildings or housings,



in which conditions outlined in subsection (1) may exist, above the 2-foot level.

(5) Areas within 10 feet of oil-storage or surge tanks shall be considered as Class I, Division II hazardous locations, and the hazardous area shall be considered as extending to the perimeter and height of dykes or fire-walls enclosing such tanks.

(6) Outdoor or unhooded areas within 10 feet horizontally and 6 feet vertically of pumps, manifolds, treaters, separators, and associated automatic custody transfer units which incorporate valves, checks, meters, or any potential source of leakage shall be considered as Class I, Division II hazardous locations.

(7) Electrical equipment in outdoor areas more than 10 feet but less than 25 feet from pumps, manifolds, treaters, separators, and associated automatic custody transfer units which incorporate valves, checks, meters, or any potential source of leakage shall be of the totally enclosed gasketed type with threaded hubs.

(8) The interior of buildings or housings in which no source of hazard exists but which are wholly or partially within an area designated under this regulation shall be considered as Class I, Division II areas.

(9) Electrical wiring apparatus and equipment installed in hazardous areas or locations classified as Class I, Division I or II, under this regulation shall comply with the requirements of the Canadian Electrical Code for the class, group, and division of the hazardous location and atmosphere concerned.

(10) Pole-lines shall not cross over hazardous locations or areas, and horizontal clearances of pole-lines passing such areas shall be maintained so that should the pole-line fall toward the hazardous location or area, no energized conductor will fall or come within 10 feet of the area limitations.

#### *Well-site Cabins and Trailers*

66. (1) Each cabin or trailer shall have an approved service switch and branch-circuit panel or equivalent approved assembly of circuit-breakers.

(2) The number of branch circuits shall be adequate to supply all equipment which is liable to be used.

(3) The service equipment shall be in a readily accessible location.

(4) From the service box, the service wires may be run with non-metallic sheathed cable to an approved weather-proof polarized male receptacle at any convenient location on the outside wall of the cabin or trailer. Female receptacles will not be approved.

(5) The service conductors and receptacles shall have adequate current-carrying capacity to carry the load of the cabin or trailer.

(6) The service conductors shall normally be run with Type S cable terminating in a polarized female plug cap of adequate current-carrying capacity for the cabin or trailer load, and at each such receptacle strain relief shall be provided to prevent strain on the mobile-home supply cord from being transmitted to the connection between the plug of the supply cord and the receptacle.

(7) The service cables shall be carried overhead to protect them from mechanical injury.

(8) Branch-circuit wiring may be run in non-metallic sheathed cable.

(9) The neutral conductor shall not be grounded at the cabin or trailer.

(10) The metal frame of the cabin or trailer shall be grounded.

#### *Removal of Rig before Suspension or Abandonment Approved*

67. (1) No operator shall remove, or cause or permit to be removed, the rig, derrick, or other drilling equipment from a well without first obtaining the written approval of an officer of the Branch, unless he has completed the well in accordance with the approved procedure or has suspended drilling operations or abandoned the well in accordance with the requirements of this regulation.

(2) No operator shall remove, or cause or permit to be removed, any casing or other equipment essential to the



proper control of a well without first obtaining approval of an officer of the Branch, which may be granted only if the officer is assured that proper control will be maintained by other means.

#### *No Well Unplugged*

68. No operator shall leave a well or test-hole unplugged or uncased after the well is no longer used for the purpose for which it was drilled or converted.

#### *Plugging Requirements*

69. (1) (a) Before abandoning a well and before removing any part of the casing therefrom, the operator shall submit to the Branch field office, on a form provided, an application to abandon a well and shall obtain from an officer of the Branch written approval of the abandonment programme and removal of casing, but such approval may first be given orally.

(b) The application shall be accompanied by sufficient information to allow the effectiveness of the proposed programme to be evaluated, and, in the case of a wildcat well, this information shall include a summary of drill-stem tests and a copy of the electrical log or its equivalent.

(2) All permeable formations shall be sealed off with cement in accordance with good oilfield practice, and, unless otherwise directed by an officer of the Branch, the position of the cement plugs shall be confirmed and, if considered necessary by an officer of the Branch, additional cement shall be used.

#### *Pulling Outside Strings of Casing*

70. In pulling outside strings of casing from any oil or natural-gas well, the annular space outside the casing left in the hole shall be kept and left full of mud-laden fluid of adequate specific gravity to seal off all fresh- and salt-water strata and any stratum bearing oil or natural gas that is not producing, except that, where in the opinion of an officer of the Branch it is necessary, any zone or zones shall be further protected by cement or other means.

#### *Restoration of Surface*

71. (1) The operator shall, as soon as weather or ground conditions permit, upon the final completion or abandonment of any well, clear the area around the location of all refuse material, burn waste oil, drain and fill all excavations, and, in the case of an abandonment, remove concrete bases, machinery, and materials, and level the surface, to leave the site as nearly as possible in the condition encountered when drilling operations were commenced, and shall notify the Branch when this work has been completed.

(2) Upon suspension of any operation of a well, an officer of the Branch may require that the operator carry out any or all restoration procedures required under subsection (1), and the operator shall carry out the required procedures and shall notify the field office of the Branch when the work has been completed.

#### *Prevention of Waste*

72. (1) The operator shall use every possible precaution in accordance with good conservation practice to stop and prevent waste of oil or natural gas in drilling and producing operations and, in storing, piping, or distributing oil or natural gas, shall not use oil or natural gas wastefully or allow it to leak or escape from natural reservoirs, wells, tanks, containers, or pipes.

(2) Reasonable precautions shall be taken to protect valves of wells, whether connected to flow-lines or not, against interference from unauthorized persons.

#### *Oil Storage*

73. (1) No oil shall be stored in any area of operations under this regulation in unprotected earth excavations or in storage receptacles that, in the opinion of an officer of the Branch, are inadequate or likely to allow waste, loss, leakage, evaporation, or to constitute a fire-hazard.

(2) Each tank or battery of tanks shall be surrounded by a dyke or fire-wall of a net capacity greater than that of the largest tank within the dyke or fire-wall, or such greater capacity as the Branch may require, and the dyke or fire-wall



shall be maintained in good condition and the area encompassed by it kept free from grass, weeds, or other extraneous combustible material.

(3) Each oil-tank or battery of tanks shall be located so as to comply with any regulations made under the *Fire Marshal Act*, and where no such regulations apply, the installation shall be so located that the distance from the outer perimeter of the ditch or dyke to any rights-of-way or easement of any road allowance or public utility, or any building, installation, or works, or any place of public concourse, or any reservation for national defence, shall not be less than three times the greatest dimension of the diameter or the height of the tank, or 200 feet, whichever is the greater, except only where there exist special circumstances that, in the opinion of an officer of the Branch, justify the location of the tanks within a greater or lesser distance.

#### *Fire-control*

74. (1) Unless otherwise approved by the Chief of the Branch,

(a) (i) all waste oil and refuse from tanks or wells must be drained into adequate pits, sumps, or proper receptacles at a safe distance from tanks, wells, or buildings and be burned immediately or transported from the site;

(ii) no fires shall be located less than 150 feet from any well or any place where oil is stored;

(iii) all fires used by the operator for any purpose shall be safeguarded by sufficient mechanical or other means so that no hazard to surrounding property shall be created;

(b) all flare-lines shall be securely anchored;

(c) no flare-pit or end of flare-line shall be located or remain nearer than

(i) seventy-five feet to a crude-oil treater; or

(ii) one hundred and fifty feet to any well, separator, crude-oil storage-tank, or other unprotected source of ignitable vapours; or

(iii) two hundred and fifty feet to any right-of-way, or easement of any road allowance, or public utility, or any building, installation, or works, or any place of public concourse, or any reservation for national defence, except only where there may exist special circumstances that, in the opinion of an officer of the Branch, justify the location within a greater or lesser distance;

(d) no flame-type stove or heater, crude-oil treater, glycol-type dehydrator installation, or other flame-type equipment shall be placed within 75 feet of any well, separator, crude-oil storage-tank, or other unprotected source of ignitable vapours, except where such flame-type equipment is equipped with flame arresters adequate for the purpose for which they are used;

(e) boilers and steam-generating equipment shall be located at a point not less than 150 feet from any well, separator, crude-oil storage-tank, or other unprotected source of ignitable vapours, and all boilers and their operation must be approved under the *Boiler and Pressure Vessel Act*;

(f) no crude-oil treater shall be placed or remain within 75 feet, shell to shell, of any type of boiler or direct-fired heater;

(g) no crude-oil treater shall be placed within 10 feet, shell to shell, of any other direct-fired crude-oil treater or indirect-fired heater;

(h) no crude-oil storage-tank shall be placed within 150 feet of any well;

(i) all battery piping shall be arranged and provided with control-valves to permit the ready shut-off of oil or natural gas in the event of fire at any battery installation;

(j) no separator shall be enclosed within the fire-wall, dyke, or ditch surrounding a storage-tank installation;

(k) all vessels and equipment from which ignitable vapours may issue shall be safely vented to the atmosphere;



- (l) every engine, motor, or electric switch within 150 feet of any well, separator, oil storage-tank, or other unprotected source of ignitable vapours must be constructed or enclosed so that it is spark-proof;
- (m) explosives of every kind and description shall be stored only in properly constructed magazines, situated not less than 500 feet from any place where any drilling or production operation is being undertaken.

#### *Report of Fires*

75. (1) Every operator shall report to the Branch immediately by telegraph or telephone and shall confirm in writing

- (a) all fires which occur at oil or natural-gas wells, tanks, or pipe-lines owned, operated, or controlled by him on his property;
  - (b) all tanks struck by lightning;
  - (c) any other fires which destroy oil or natural gas; and
  - (d) any breaks or leaks in tanks or pipe-lines from which any serious loss of oil or natural gas has occurred.
- (2) In all reports of fires, breaks, or leaks, or other accidents of this nature, the location of the well, tank, or line break shall be given, showing, where possible, the location by the grid system or by part of a section, township, range, and meridian.

#### *Multi-zone Completions*

76. (1) No well shall be completed for production from more than one pool or zone unless permission in writing has first been obtained from an officer of the Branch.

(2) An application for permission to complete a well as a multi-zone well shall be accompanied by

- (a) a description of the current completion status of the well;
- (b) a full-scale electric log or radioactive log of the well on which the geological members, the upper and lower limits of each, gas-oil, gas-water, and oil-water interfaces, and the proposed perforated intervals are marked;

- (c) a statement as to the proposed kind of completion, whether multi-zone oil, multi-zone gas, or otherwise, and indicating the flow-channels for each fluid;
  - (d) a diagrammatic cross-sectional sketch of the zones to be produced, showing the proposed depths and type of equipment;
  - (e) a description of the measures to be used during completion to ensure segregation in so far as it is practicable;
  - (f) a description of the proposed procedure for maintaining segregation during work-overs and repairs;
  - (g) a description of the proposed test of segregation behind the casing;
  - (h) a description of the proposed segregation test procedure and all pertinent information for the proper evaluation of such procedure;
  - (i) a description of the method of taking reservoir pressure measurements; and
  - (j) a statement of the anticipated recoverable reserves of each zone.
- (3) The application may be approved subject to such conditions as deemed necessary by an officer of the Branch.
- (4) The operator shall, within thirty days after a well has been completed as a multi-zone well, submit in triplicate to the Branch
- (a) a diagrammatic sketch showing
    - (i) the type and make of each component of the sub-surface installation;
    - (ii) the setting depths of the various components in relation to the porous zones, the casing and liner setting depth, gas-oil, gas-water, and oil-water interfaces of each completion zone, the perforated intervals; and
    - (iii) the flow-channels for the fluids;
  - (b) a detailed report of the completion and segregation tests; and
  - (c) information on gas, oil, water, or other characteristics where evidence of segregation is based on differences in such characteristics.



- (5) The operator of a multi-zone well shall
  - (a) conduct tests at regular intervals to confirm segregation of fluids in each multi-zone well as prescribed or approved by an officer of the Branch;
  - (b) notify the Branch field office at least three days in advance of any segregation test at the well.
- (6) The operator of a multi-zone well shall not modify the sub-surface installation, a producing interval, or conduct remedial work in a producing zone unless he first obtains the approval in writing by an officer of the Branch, providing, however, that where the operation is necessary to obtain segregation, an officer of the Branch may first give verbal approval.
- (7) The operator of a multi-zone well, within thirty days after a work-over, shall submit in duplicate to the Branch a complete report of the operation with revised diagrammatic sketches.
- (8) The production from one pool or zone shall not be commingled with that from another pool or zone before measurement unless an application, on a form provided, has been approved by an officer of the Branch.

#### *Prescription of Standards*

77. (1) Where the measurement of natural gas is required for any purpose under the Act or this regulation, its volume shall be computed as the number of cubic feet it would occupy at Standard Conditions (S.C.) of 14.65 pounds per square inch absolute at a temperature of 60 degrees Fahrenheit.
- (2) Whenever the conditions of pressure and temperature differ from the Standard Conditions prescribed in subsection (1), conversion of the volume from the measured conditions to the Standard Conditions shall be made in accordance with the Ideal Gas Laws and corrected for deviations from the Ideal Gas Laws whenever such correction exceeds 1 per cent.
- (3) Correction of deviation from the Ideal Gas Laws shall be based on tables of the American Gas Association published in Gas Measurement Committee Report No. 3, or as subsequently amended by the same authority.

#### *Natural-gas Metering*

78. (1) A well producing natural gas shall be equipped with a natural-gas meter approved by an officer of the Branch, and no natural gas shall be produced from a well unless it is metered, but an officer of the Branch may give permission to dispense with the installation of a meter or with the metering of natural gas at any specified well.

(2) Where, for economy of operation, natural gas from several wells is brought to a common site for metering, each meter shall be marked clearly to indicate the source of natural gas being measured.

(3) Where an orifice meter is used, the installation shall be arranged so as to permit ready inspection of the orifice plate by an officer of the Branch.

(4) Any by-pass around a meter shall be closed by valves or stop-cocks which effectively stop all flow of natural gas when closed; and every occasion when the by-pass is operated and on any extraordinary occasion when natural gas does not reach the meter, a suitable entry shall be made in the appropriate report; and where an orifice meter is installed, a record shall be made also on the meter chart.

(5) Whenever an orifice plate is changed, a record of the time of change and the sizes of orifice removed and inserted shall be similarly recorded on the meter chart and in the appropriate report, and within the meter-cover.

(6) Each orifice-meter installation shall be equipped with a thermometer-well.

(7) The measured inside diameter of the pipe at the orifice shall be clearly marked on the pipe near the orifice flanges, and the date of measurement and the name of the person making the measurement shall be recorded in the meter-shelter.

(8) At installations where an orifice plate is bolted in place, the plate shall show clearly the size of orifice, in inches to three places of decimals, by figures stamped or cut into the metal of the plate, and a plate shall not be rebored without first removing or permanently defacing the old marking.



(9) All meters shall be inspected as frequently as may be necessary and maintained in good and usable condition by adjustments or replacements of parts.

(10) The meter shall be suitably safeguarded from weather and from interference by unauthorized persons.

79. (1) Orifice-meter charts shall be clearly marked in such a manner as to indicate the well or wells being metered, the time and the date of the start and finish of the records, and the size of the orifice and the diameter of the meter-run.

(2) The temperature of the flow-stream shall be measured once per cycle and recorded, with the time of measurement, on the meter chart.

(3) Charts shall be computed on a daily basis, unless otherwise approved, and shall be retained by the operator for a period of one year.

(4) When computing the quantity of natural gas passing through the meter during the period covered by a chart, all metered natural gas shall be recorded, together with a fair estimate of all unmetered natural gas during all periods in which the meter failed to record.

(5) Coefficients for calculating meter charts shall be computed according to the code published as Gas Measurement Committee Report No. 3, or as subsequently amended and referred to in subsection (3) of section 77.

#### *Group Metering*

80. An officer of the Branch may permit group meter measurements.

#### *Inadequate or Incorrect Measurements*

81. (1) Where, in the opinion of an officer of the Branch, adequate measurements are not being made of the natural gas produced from a well, the officer may require that the well be closed in until such time as arrangements for adequate measurements have been made.

(2) Upon the discovery of any natural-gas metering error, the operator shall have the meter corrected immediately and shall report corrected production from the date of discovery

of the error and estimated retroactive corrections for the period during which the meter measured incorrectly.

#### *Seals*

82. (1) An officer of the Branch, whenever it is considered necessary to do so, may seal or cause to be sealed with a metallic seal any or all valves or meters installed at a well or on any pipe-line, tank, or other receptacle used for the storage or transportation of oil or other fluid produced or withdrawn from the well, and may remove or authorize the removal of such seals.

(2) The operator shall be notified in writing by the officer of the affixing of the seal and the reasons therefor.

(3) The operator of a well shall not permit any unauthorized person to remove or tamper with any seal so affixed.

(4) Any seal so affixed may be removed without authority in writing from an officer of the Branch only in case of emergency, and in such a case the Branch shall be notified by the most expeditious method.

#### *Reservoir Surveys*

83. (1) The Chief of the Branch may require a survey of a reservoir containing oil or natural gas, to be made in accordance with good oilfield practice, at such time and in such manner as he may deem advisable, and the report of such survey may include

- (a) the condition of the reservoir;
- (b) the practices and methods employed by the operators;
- (c) the volume and source of crude oil, natural gas, and water;
- (d) the average pressure of the reservoir;
- (e) the areas of regional or differential pressure;
- (f) stabilized gas-oil ratios;
- (g) the producing characteristics of individual wells in any field;
- (h) the producing characteristics of any field; and
- (i) such other information as he may require.



(2) (a) Where a reservoir survey is required to be made according to the provisions of this section, operators shall make or permit or assist officers of the Branch to make any or all tests that may be required by the Chief of the Branch.

(b) The Crown is not liable for any damage incurred as a result of making any such test or survey.

(3) In the case of any test on any well, the operator, when requested by an officer of the Branch, shall give reasonable notice of the time of the test in order that it may be witnessed by an officer of the Branch.

#### *Notification of Tests*

84. The operator shall notify the Branch field office at least twenty-four hours in advance of any initial production or evaluation test in order that the test may be witnessed by an officer of the Branch.

#### *Official Absolute Open-flow Potential Tests*

85. (1) An official absolute open-flow potential shall be determined, for each natural-gas well, by a back-pressure test.

(2) Unless otherwise approved prior to the test, every official absolute open-flow potential test shall be witnessed or made by an officer of the Branch.

(3) A standard test procedure, including a method of calculating the results, may be established for any field or pool by the Chief of the Branch, and where a standard test procedure has been established, it shall be used for all natural-gas wells in the field or pool.

(4) An official absolute open-flow potential test shall be made annually by an operator on each of his producing natural-gas wells and at such other intervals as may be designated by the Chief of the Branch.

(5) A detailed report of every official absolute open-flow potential test shall be certified and submitted to the Branch within thirty days of the date upon which the test was made.

#### *Restriction of Gas Production*

86. (1) Unless it is otherwise directed by an officer of the Branch, the production of natural gas from any natural-gas

well shall be restricted to not more than 25 per cent of its official absolute open-flow potential or to a rate of 2,000,000 cubic feet per day, whichever is the greater amount.

(2) Notwithstanding the provision of subsection (1), the Chief of the Branch, under section 5 (1) (e), may, by general or special orders, regulate the production of natural gas from any well or pool.

(3) No natural-gas well shall be placed or kept on production until the test data has been received by the Branch and the official absolute open-flow potential has been established by an officer of the Branch.

#### *Deliverability Tests*

87. The deliverability of each natural-gas well connected to a transmission system shall be determined by tests approved by the Chief of the Branch, and a detailed report of every deliverability test shall be certified and submitted to the Branch within thirty days of the date upon which the test was made.

#### *Shut-in Pressure Measurements*

88. (1) The operator shall measure the shut-in pressures in all producing natural-gas wells annually.

(2) Shut-in pressures shall be measured with a dead-weight gauge after a minimum shut-in period of twenty-four hours.

(3) All shut-in pressures and the duration of the shut-in period thereof shall be reported to the Branch field office within thirty days of the date upon which the pressures were taken.

#### *Bottom-hole Pressure Measurements*

89. (1) Bottom-hole pressure surveys shall be made annually by each operator in specified wells in all oilfields or at such other intervals as may be designated by the Chief of the Branch.

(2) The surveys shall be run in accordance with general or special instructions issued by the Chief of the Branch.



(3) All bottom-hole pressures shall be reported to the Branch field office within thirty days of the date upon which the pressures were taken.

#### *Production Tests—Oil Wells*

90. (1) Regular production tests shall be made on oil wells as directed or approved by an officer of the Branch, and each test shall be of a duration similar to a normal daily producing period, and the report thereof shall include, where applicable,

- (a) oil, gas, and water production; and
- (b) the A.P.I. gravity of the oil; and
- (c) casing and tubing pressures; and
- (d) duration of test in hours; and
- (e) separator pressure.

(2) Each new or recompleted oil well shall be tested initially for a period of not less than eight consecutive hours, and a report shall be submitted to the Branch at the end of each calendar week during the test showing the oil production, net gas-oil ratio, water production, and the A.P.I. gravity of the oil.

#### *Water Production*

91. (1) The quantity of all water produced from any well shall be reported to the Branch field office.

(2) The operator shall dispose of all water produced by a method satisfactory to the Chief of the Branch.

(3) A report of the quantity of all water produced for each well of every pool shall be submitted monthly on the prescribed form to the Chief of the Branch.

#### *Records*

92. Each person who produces, sells, purchases, acquires, stores, transports, refines, or processes oil or natural gas shall keep and maintain in the Province complete and accurate records of the quantities thereof, which shall be available for examination at all reasonable times by any person authorized by the Chief of the Branch, and the Chief of the Branch

may require the person maintaining the records to file with the Branch such reports as he may require.

#### *Compliance with the Regulation*

93. (1) No person shall do or omit to do anything, or cause or allow to be done or omitted anything, in contravention of or not in accordance with this regulation.

(2) Where an officer of the Branch is authorized to issue an order under this regulation, the operator shall comply with the order.

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