

Guideline

Petroleum Drilling Regulations

(CNR 1150/96)

Topic: Final Well Report –Onshore Petroleum Exploratory Wells

Ref: Section 151

151(1) An operator shall prepare a final well report on termination of a well drilled by him or her and shall submit to the director a copy of the report within a period of 90 days of the rig release date in the case of an exploratory well, unless a different period is approved by the director.

1. Introduction

The purpose of this document is to provide details regarding the content and preparation of Final Well Reports for onshore petroleum exploratory wells.

One (1) paper copy, and a digital copy, in *.pdf format, as well as a copy of all digital data files, provided in *.pdf and a digital format acceptable to the Director, must be submitted within ninety

(90) days of the rig release date, to:

Department of Industry, Energy and Technology
Energy Branch
P.O. Box 8700
4th Floor Natural Resources Building
50 Elizabeth Avenue
St. John's, NL, A1B 4J6

Attention: Annie Parrell
Petroleum Engineering Division
Email: petroleum_devlopment@gov.nl.ca

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2.0 GENERAL FORMAT

Final well reports should be prepared on letter-sized paper, suitably bound. In addition to print, the final well report is required in *.pdf format. Tabular data contained therein should be submitted in *.pdf and ASCII or Excel format. All logs are required to be submitted in print, *.pdf digital file format and in *.las file format, or another format approved by the Director. All digital files should be included on a CD or DVD and be submitted with the paper copy. Measurements should be given using the S.I. system unless otherwise approved. Dates and times should be given as year/month/day/hour. Each of the subjects listed in this document should be addressed in the report. If information pertaining to a particular heading does not exist, will not become available, or, is not applicable to the well, a statement to this effect should be made.

- 2.1 Title Page
Full name of the well, name of the operator's representative responsible for the report and the date that the report was prepared.
- 2.2 Introduction
A synopsis of approximately 500 words giving the nature and purpose of the well, name of the operator and drilling contractor, name and type of drilling rig, a summary of operations at the well site, the formations penetrated ; the results of any formation flow testing and the current status of the well i.e., suspended or abandoned.
- 2.3 Map
A single page map showing the location of the well.
- 2.4 General Information
Include well name, Exploration Permit, Drilling Program Approval and Authority to Drill a Well numbers, the location of the well, illustrated on a land survey including co-ordinates as per NAD 27, and a description of the surveying system used to determine the final well position.
- 2.5 Difficulties and Delays
Provide a summary of any problems encountered and the steps taken to overcome the problems. An estimate of the total time delay for each problem encountered should be provided.

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3.0 DRILLING OPERATIONS

The following data should be provided:

- 3.1 Elevation - elevation above mean sea level of natural ground level, casing flange, kelly bushing (or rotary table or rig floor where applicable).
- 3.2 Total Depth - specify total vertical and measured drilled depth, logged depth and, if applicable, plugged-back depth.
- 3.3 Spud Date - date and hour spudded.
- 3.4 Date Drilling Completed - date and hour total depth of the well was reached.
- 3.5 Rig Release Date - date and hour the drilling rig last conducted operations on the well.
- 3.6 Well Status - suspended, abandoned or completed.
- 3.7 Hole Sizes and Depths - bit diameters and total depth drilled for each section of the well.
- 3.8 Bit Records - as per current IADC/CAODC codes and format.
- 3.9 Casing and Cementing Record - for each casing string, indicate size, weight, grade, number of joints, type of thread/connection, depth of shoe and make and type of casing hangers and seals. With respect to cementing details, indicate location of centralizers and scratchers, sacks of cement, slurry volume, type and amount of cement additives, the intervals cemented or top of cement behind each casing string and the basis for the estimated top of cement, i.e., calculations or cement bond log.
- 3.10 Sidetracked Hole - describe any sidetracked hole, the reason for sidetracking, the method used and the effectiveness of the operation.
- 3.11 Drilling Fluid - type of drilling fluid and summary of the properties maintained for each phase of the hole.
- 3.12 Fluid Disposal - Details of any fluid disposal down hole, including volumes, rates, pressures, dates, nature of the fluid.
- 3.13 Fishing Operations - details of any fishing operations, a description of any fish left in the hole and a statement regarding the probable cause of the problem.

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- 3.14 Well Kicks - details of any kicks encountered including volumes, pressures and a summary of associated well control operations.
- 3.15 Formation Leak-Off Tests - details of each leak-off test including depth, mud density, applied surface pressure, mud weight equivalent and last casing depth. Copies of the leak-off test reports and graphs should be included.
- 3.16 Time Distribution - a table of the hourly activity as recorded on the IADC/CAODC Daily Drilling Reports (Tour sheets) from the hour the well was spudded to the time the rig was released, showing the total hours for each type of operation.
- 3.17 Deviation Plot - a plan view showing the location of the well bore with respect to the well head. The bottom hole co-ordinates, referenced to surface location, should also be provided. A digital copy of deviation surveys performed should be included in an Appendix.
- 3.18 Abandonment/Suspension Plugs - type and depth of plugs including, for cement plugs, the type and amount of cement and additives. The nature of fluids remaining between plugs should also be provided.
- 3.19 Well Schematic - showing casing, tubing plugs and any other equipment installed in or on the well.
- 3.20 Fluid Samples - a listing of all fluid samples collected, including depths, type, number and volume, tests conducted and final disposition. Reports and/ or results of tests should be included in Appendix.
- 3.21 Composite Well Record - a chart summarizing all relevant drilling and geological data on a suitable depth scale, including the following information:
- time-depth plot denoting all major operational activities
 - major lithological units
 - rates of penetration
 - gas detection curves
 - hydrocarbon shows
 - cores
 - bit record
 - casing points
 - test intervals
 - plugs

NOTE: This record may be provided as an appendix.

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4. GEOLOGY

The following data should be provided:

- 4.1 Drill Cuttings - frequency of sampling, any intervals for which samples were not obtained, distribution of samples and location of stored suites of cuttings.
- 4.2 Cores - for conventional cores, provide, in tabular form, core number, interval and recovery. For sidewall cores, indicate depths sampled and portions recovered. If tested to destruction, indicate results - use of an appendix or separate report is also acceptable. The location of storage for any remaining core should also be provided.
- 4.3 Lithology - lithological description of all cuttings and cores, including any visual shows of hydrocarbons, as seen under either conventional or fluorescent light.
- 4.4 Stratigraphic Column - table of formations or biostratigraphic units showing name, age, lithology, palaeontology, depth, sub-sea elevation and thickness of each stratigraphic unit penetrated.
- 4.5 Biostratigraphic Data - chart summarizing the biostratigraphic data (palynology, micropalaeontology) with reference to the lithostratigraphic picks in the well.

5. WELL EVALUATION

The following data should be provided:

- 5.1 Down hole Logs - list of logs run including date, run number, type, interval and service company. Copies of consolidated logs, if not already provided, should be included as an appendix.
- 5.2 Other Logs - list of other logs, such as computed dipmeter, deviation and drift records and records from gas detection and mud logs. Copies of these logs may also be included as an appendix.
- 5.3 Synthetic Seismograms - processed to match the operator's recent seismic data in the vicinity of the well and displayed on an equivalent time scale - may also be provided as an appendix.

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- 5.4 Vertical Seismic Profiles - final report of any vertical seismic profile surveys, which includes the information required for velocity surveys and a display of the profile on a time scale corresponding to the time scale of the operator's seismic data near the well. This report may be provided as an appendix.
- 5.5 Velocity Surveys - final report of any velocity surveys (check-shot surveys) which includes summary tables of true vertical seismic time relative to the datum of the seismic data, interval velocity, average velocity, root mean square velocity and reflection coefficient sequence. This report may be provided as an appendix and is required only if vertical seismic profiles are not available for the well.
- 5.6 Formation Stimulation - date(s), intervals, method, contractor, types and quantities of stimulants and the results of any formation stimulation. This report may be provided as an appendix.
- 5.7 Formation Flow Tests - date(s), test number, intervals, the method of obtaining pressures and a summary of the results of any formation flow tests. Details of the tests and data and any analysis thereof, including *.pdf and digital format, should be provided in a separate report or appendix.

6. OTHER

The following data and reports should be included as appendices, where applicable:

- 6.1 Mud Loggers Report
- 6.2 Directional & Deviation Survey Report(s)
- 6.3 Final Legal Survey Plan
- 6.4 Core Photos
- 6.5 Core Analysis Report - together with one (1) copy of digitized data (ASCII format) on DVD or CD.
- 6.6 Fluid Analysis Report(s) and Digital Data where applicable
- 6.7 Oil, Gas and Water Analysis Report(s) and Digital Data where applicable
- 6.8 Geochemical Report
- 6.9 Biostratigraphy Report
- 6.10 Petrological Report
- 6.11 Palynological Report
- 6.12 Paleontological Report
- 6.13 Formation Flow Test Report and Digital Data
- 6.14 PVT Report and Digital Data

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