

APPLICATION FOR AUTHORITY TO DRILL A WELL (ADW)

Operator:

Pursuant to section 8 and 9 of the Petroleum and Natural Gas Act (R.S.N.L. 1990, c. P-10) and in compliance with section 29 of the Petroleum Drilling Regulations, (CNR 1150/96), the Operator hereby applies for Authority to Drill a Well (ADW)

The undersigned Operator's Representative hereby declares that, to the best of his or her knowledge, the information contained or incorporated herein is true, accurate and complete.

Operator's Representative:	(Printed Name)	_ Signed:
Title:		_ Date:

Instructions:

- 1) Instructions to assist the Operator in completing this application are provided throughout the document in Blue font. The text in Blue font should be deleted prior to submission to the Department of Industry, Energy and Technology (IET) Petroleum Development Section.
- 2) Once the application is completed, it should be signed and dated in blue ink by the Operator's representative responsible for the drilling program. A hard copy of the application, together with a CD containing both the MS Word document and a pdf of the signed version of the application, as well as electronic copies of any files and attachments associated with the application, including an MS Excel spreadsheet of any proposed well trajectory, should be submitted to IET. Electronic submission can be submitted to the Petroleum Development email account at: petroleum_development@gov.nl.ca
- **3)** Provided that the application is complete and the proposed program is consistent with the *Petroleum Drilling Regulations (CNR 1150/96)* and associated guidelines, approval will normally be issued within 21 days.
- 4) When completing this application, Operators should note that all of the requirements related to Drilling Program Approval (DPA) including benefits plans, financial responsibility, safety plans, contingency plans, environmental protection plans and field data acquisition programs also apply to this approval.
- 5) All diagrams, schematics, tables or other documents embedded within this application, or attached as an Appendix to this application, must be of high resolution for easy readability.
- 6) Any deviations from an approved ADW during the execution of the program should be brought to the attention of the IET as soon as reasonably practicable. In all circumstances, IET is to be notified prior to the implementation of any proposed change.

1.0 Introduction

Describe the purpose, timing and objectives of the well (1-2 paragraphs).

2.0 General Information

Well Name:		
Permit/License/Lease		
Basin/Field/Pool:		
Drilling Rig:		
Rig Type:		
Drilling Contractor:		
Geographic Coordinates:	Long	
	Lat	
Estimated Elevation (meters):	RT	
	GL	
Estimated Total Depth (MD):		
Anticipated Spud Date:		
Anticipated time to Drill Well:		
Estimated Cost:		

3.0 Legal Survey Plan

A legal survey shall be used to confirm the location of all wells as soon as practical. The Operator must submit a tentative survey plan with the application and embed within this section.

4.0 Site Meteorological and Environmental Consideration(s)

Operator to describe how the program has been designed to overcome the meteorological and environmental conditions referred to in the application for Drilling Program Approval (DPA). This shall include providing the prevailing environmental conditions in the area of the drill site, the expected discharge at the drill site and details of the equipment, procedures and resources to be employed to protect the natural environment in the vicinity of the proposed well.

5.0 Geological Prognosis

5.1 Description

Provide a technical description of the prospect. This description should emphasize structural and depositional interpretations, identify the target formation(s), play type (structural, stratigraphic and/or both) and include a discussion of the rationale for selecting the well location.

5.2 Stratigraphic Chart(s)

Insert a diagrammatic presentation of the anticipated stratigraphic section and the interval velocities used to produce the section.

5.3 Anticipated Lithology

Provide a discussion of the anticipated Lithology. This is to include the depth, thickness and Lithology of anticipated formations. Also, please provide interval velocities or other sources of information used to produce this section.

5.4 Geologic Tops

Complete the following table. Please ensure that the depth uncertainty associated with each top is included.

Formation/Zone	mRT (MD)	mRT (TVD)	+/- m (TVD)

5.5 Prospective Horizons

Complete the following table.

Target	Target Name	UTM Easting (meters)	UTM Northing (meters)
1			
2			
3			

Please provide a technical description of each of the target formations. Structure maps are to be provided in Section 5.6.

5.6 Well Section

Where offset well data is available, embed in this section of the application, or attach as an Appendix:

- 1. A stratigraphic cross-section showing regional geologic markers and interpretations superimposed on a relevant suite of logs
- 2. A seismic-geological schematic showing structural and stratigraphic interpretations.

In both cases, the targeted formation(s) should be highlighted, and the figure should be at an adequate resolution to clearly depict the logs and geological markers.

5.7 Geophysical Maps

Please provide a series of time structure or depth structure contour maps illustrating the areal configuration of the major horizons. Depth structure contour maps to be produced from drill logs if no seismic is available.

5.8 Seismic Data

If seismic data has been acquired, at least 2 fully processed seismic sections, crossing the proposed well site or projected across the proposed well site which preferably should be orthogonal. This would include interpreted and un-interpreted copies of both lines.

6.0 Well Evaluation Program

6.1 Mud Logging Program

Please outline details of the mud logging program that will be conducted during operations. The Operator is to ensure that this program will be conducted in compliance with Petroleum Drilling Regulations.

6.2 Drill Cuttings

	Purpose	Sample	Frequency	Destination /Comments
		<u>, , , , , , , , , , , , , , , , , , , </u>		
uo	Lithological Analyses	1 set washed and dried cuttings 1 vial container (25ml)	IET Requires minimum of 1 sample every 5 meters	• IET
Hole Secti	Geochemical Analysis	1 set unwashed cuttings 500g in a moisture-proof container	IET Requires minimum of 1 sample every 10 meters	• IET
	Fluid Analysis 1 Fluid Sample		 Drilling – As Obtained. Formation Flow Testing – one sample minimum per formation tested 	• IET – on request of Director

6.3 Conventional Coring and Wireline Logging Program

Please complete the attached Table 1 respecting conventional coring and logging components of the well evaluation program.

Conventional Coring: The operator shall ensure that conventional cores are taken in accordance with the specified program contained in Table 1. Specific details on how conventional core shall be taken and the subsequent analysis are outlined in Section 100 (3) and 101, respectively, of the Petroleum Drilling Regulations.

Wireline Logging: The operator shall ensure that wireline logs that are necessary for the proper evaluation of a well are taken over all uncased intervals in the well below the

surface casing. Please refer to Part VI – Well Evaluation of the Petroleum Drilling Regulations for complete details on wireline log requirements.

6.4 Formation Flow Testing

The operator shall ensure that every formation in a well is sampled or tested to obtain fluid flow and reservoir pressure data from the formation where there is an indication that the result of that sample or test will contribute substantially to the evaluation of the formation. Also, an operator shall ensure that a formation flow test is conducted if fluid samples and productivity data are required and wireline formation samples do not provide sufficient information for the evaluation of the formation.

Please indicate if formation flow testing is planned at this point. Please note that, the operator will be required to submit a detailed testing program before conducting any formation flow testing. This program shall be in compliance with the requirements stated in Part VII – Formation Flow Testing of the Petroleum Drilling Regulations and as per best industry practices.

7.0 Drilling Program

7.1 Subsurface Conditions anticipated during drilling

Please outline the subsurface conditions anticipated at the proposed drill site that may affect the safety and efficiency of the drilling operations including the depth and nature of formations where problems such as geo-hazards, lost circulation, swelling shale and abnormal pressure zones are anticipated.

This discussion should include, to the extent applicable, wellbore instability, faults, hydrocarbon bearing formations, H₂S and any other subsurface hazards.

7.2 Offset Well Data

Please include a summary or description of the offset well data used in the planning and engineering of the well.

7.3 Drilling-Time Curve

Embed in this section of the application, or provide as an Appendix, a time-depth curve for the well. If the drilling program plan includes suspending the well before all drilling activities are completed, then this should be reflected in the time-depth curve.

7.4 Directional Plan

The directional plan should be provided as an MS Excel spreadsheet. The minimum required parameters include measured depth, inclination and azimuth, although other parameters may be provided at the Operator's discretion. If the application is for an exploration well, and the well trajectory crosses from one permit to another, then this section of the application should also identify the measured depth at which the well trajectory will cross over the boundary for the two permits

The directional plan should contain both surface location and proposed bottom hole coordinates. In the case of an onshore-to-offshore well, plan should identify the measured depth at which the well enters the offshore area, defined as the original low water mark along the open coast of the province.

7.5 Formation and Fracture Pressures

Embed in this section of the application, or provide as an Appendix, a plot illustrating the anticipated pore pressure, planned drilling fluid densities and fracture gradient profiles for the well and provide a narrative description of the basis of the pore pressure/fracture gradient prediction.

7.6 Hole Sizes and Depths

Complete the table below. In the case where contingency hole sizes are an option, this should be described in the comments section below.

Bit Size	Anticipated Total Depth				
(mm)	mRT (MD)	mRT (TVD)			

Comments:

7.7 Casing and Cementing Program

Casing Design

For each proposed casing string, complete the table below. If this application is for a sidetrack, then the ODs, weights and grades of the existing casing strings, that will form part of this well, should also be provided. In the case where contingent casing strings are planned, this should be either included in the table or described in the comments section following the table below.

Interval mKB MD (mKB TVD)		Outer Diameter (mm)	Weight (kg/m)	Grade
	Design Summary	Comn	nents ¹	
Duret	Highest Load (kPa)			
Bursi	Rating (kPa) ²			
	Safety Factor ³			
	Design Summary	Comn	nents1	
Collanso	Highest Load (kPa)			
Collapse	Rating (kPa) ²			
	Safety Factor ³			
	Design Summary	Comn	nents ¹	
Toncilo	Highest Load (daN)			
rensie	Rating (daN) ²			
	Safety Factor ³			

Notes:

- 1. Include a summary of the design load cases that were evaluated, together with a description of the worst-case design load and the depth at which the lowest safety factor occurs.
- 2. Indicate the rating of the casing or the connector (whichever is lowest). In the case where non-API casing is proposed, information respecting the casing burst, collapse and tensile specifications should be provided separately to IET.
- 3. The minimum design factors used in the design of well casings shall be:
 - (a) 1.33 for burst, for surface and intermediate casing;
 - (b) 1.0 for burst, for conductor casing, production casing and liners;
 - (c) 1.0 for collapse; and
 - (d) 1.6 for tension.

Please refer to Part III of the Petroleum Drilling Regulations – Casing for complete casing requirements.

Comments:

Cementing Design

Complete the table:

OD Cement	Slurry Volume (m3)		Slurry Density (kg/m³)		Proposed Top of Lead Cement		Proposed Top of Tail Cement		
(((((((((((((((((((((((((((((((((((((((Classification	Lead	Tail	Lead	Tail	mRT (MD)	mRT (TVD)	mRT (MD)	mRT (TVD)

Note: Please refer to Part III of the Petroleum Drilling Regulations – Casing for complete details of cementing program requirements

Describe below, the proposed composition of the cement slurries for each casing string:

Casing and Cementing Pressure Tests

Complete the table:

OD (mm)	Pressure Surface Test Pressure (kPa)	Anticipated Fluid Column Density (kg/m³)	Comments

Notes:

- 1. Indicate the proposed applied surface pressure as well as the fluid density anticipated during the test.
- 2. In the comments section, describe the basis for the proposed pressure test in terms of the worst case load condition that the test is based on.

3. Please refer to Sections 61-63 of the Petroleum Drilling Regulations for complete pressure testing requirements.

Comments:

7.8 Blowout Preventer System

Blowout Preventer Stack

Complete the table:

Component	Size (mm)	Rating (kPa)

Blowout Preventer Pressure Tests

Complete the table (pressures should be provided in kPa).

Hole	Annulars		Pipe Rams		Shear Rams	
Section (mm)	Low	High	Low	High	Low	High

Notes: Please refer to Part IV of the Petroleum Drilling Regulations – Well Control Equipment for complete details on BOP equipment and pressure testing requirements.

Comments:

7.9 Drilling Fluid Program

Complete the table:

Hole Size (mm)	Mud Type E.g., Seawater w/ PHG sweeps (SBM, etc)	Proposed Density (kg/m³)

Notes: Please refer to Part V of the Petroleum Drilling Regulations – Drilling Operations and Procedures, Sections 70-74 of the Petroleum Drilling Regulations for complete details on Drilling Fluid system and monitoring requirements.

Comments:

7.10 Sequence of Drilling Operations

Please provide the details of the sequence of drilling operations and procedures to be used for each phase of the hole. This would involve, at a high level, the step-by-step sequence of operations for the proposed drilling program, including planned pressure tests of BOPE and casing strings. If the well is to be suspended before completion of all drilling activities, or if more then one drilling facility is to be used to complete the drilling activities, then this should be reflected in the sequence of operations.

7.11 Well Schematic

Embed in this section of the application, or attach as an Appendix, a schematic of the proposed well illustrating the hole sizes, casing program, proposed tops of cement and such other information as may be necessary to illustrate the proposed well design.

7.12 Leak-Off/Formation Integrity Test

Provide a summary of the plans for conducting leak-off test or formation integrity test.

Note: An operator shall conduct a pressure test in the hole to determine the pressure integrity of the formations present in the hole:

(a) before drilling more than 60 metres below the shoe of a casing other than the conductor casing; and

(b) when an over-pressured zone is about to be penetrated.

This test shall test the formation to a pressure which is the lesser of one and one-third times the indicated formation fluid pressure and the pressure at which the formation begins to accept the test fluid before the point of fracturing.

Where a well is to be abandoned, an operator shall pressure test a formation to its fracture point on the request of the director during the abandonment of the well.

8.0 Well Termination

8.1 Well Completion

If it is known at the time of submission that the well is to be completed, indicate a general description of the completion.

Please note that the operator will be required to submit a detailed completion program and associated Well Termination Form for review prior to carrying out the proposed activities.

8.2 Well Abandonment/Suspension

Please outline a description of the estimated abandonment/suspension program and complete the following table outlining the plugs that will be set. This program, along with the site reclamation, will form the basis of the required abandonment estimate and deposit required before the well can be approved.

Plug #	Description	Depth/Interval (mRT MD)	Proposed Pressure Test (kPa)	To be Tagged (Yes/No)

This description should also be supplemented with a well schematic that illustrates the planned location of the plug(s) and any other pertinent information that aids in depicting the proposed configuration of the abandoned or suspended well.

Please refer to Part VIII of the Petroleum Drilling Regulations – Well Termination for complete details of well abandonment/suspension requirements. Confirmation should also be provided that the manner in which the well will be abandoned or suspended meets the requirements of the Regulations, particularly as it relates to the need to isolate porous and permeable intervals, abnormally pressured zones, lost circulation zones, etc.

If the application involves the suspension of a well, the estimated duration that the well is expected to be suspended should be indicated, together with the future proposed plans for the well; otherwise, indicate "Not Applicable".

9.0 Environmental/Regulatory

9.1 Pollution Prevention Plan

Where a proposed well is to be located within 100 metres of the normal high water mark of a body of water or permanent stream, the operator shall submit evidence that he or she has obtained prior written approval of his or her plan to prevent pollution of the water from those regulatory bodies that have jurisdiction in respect of the drill site.

These plans shall

(a) indicate the elevation of the land and water surfaces adjoining the drill site;

(b) describe special problems at the drill site;

(c) include details of the construction and maintenance of dikes, reservoirs and other installations intended to be constructed; and

(d) provide particulars in respect of the method to be used to dispose of mud, oil, water or other fluids associated with the proposed drilling operations.

9.2 Government Approvals

Please provide the title, date and registration numbers of any applicable governmental approval or application for approval pertaining to this drilling program. This would include License to Occupy, Water Use License(s), etc.

9.3 Environmental Assessment

Provide the title and date of any applicable environmental assessment document pertaining to this drilling program.

10.0 Contact Information

Identify the person from whom IET can seek clarification in the event of any questions with this application.

Name:	
Title:	
Telephone Number:	
E-mail Address:	

End

Hole Size (mm)	Interval (m)	Dev (Max)	Mud Type	Conventional Coring	LWD	Wireline	Cased Hole	Comments

 TABLE 1

 Well Evaluation Program – Conventional Coring and Logging

Note: Should a well evaluation program require alteration, the Operator is required to obtain approval of the proposed deviation before proceeding.

Provide, in the space on the next page, any additional information or clarifying notes respecting compliance with the well evaluation requirements. In particular, this should include:

- 1) the objectives of the coring program together with the targeted formation(s) to be cored, the length and diameter of core to be cut and the criteria to be used to determine core point;
- 2) a Glossary of any abbreviations used in the Table; and
- 3) The circumstances where any Optional or Contingent logs would be acquired.

Comments:

[Please type here]j

Glossary of Terms:

[Please type here]j