



REGULATORY REQUIREMENTS PRIOR TO COMMENCEMENT OF DRILLING:

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PROPRIETARY INFORMATION

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1. PURPOSE

This document is intended to provide guidance to the right holders on the documents required by the Agency prior to the commencement of the drilling of the well for both exploration, appraisal and development purposes. The holder of the exploration or production right must be in possession of all the required permits/authorizations from all the relevant Departments concerned, and must have submitted and received approval on the documents mentioned in these guiding document before commencing with the drilling of the well.

2. SCOPE

These guiding document lists only those documents which must be submitted to the Petroleum Agency SA ("The Agency") prior to well drilling, and it applies to both onshore and offshore drilling, however, additional documentation may only be required for either offshore or onshore drilling only, in such case, it will be noted accordingly.

This document is to be updated should there be any changes in the current legislation and regulations relating to the petroleum exploration and development.

3. GENERAL REQUIREMENTS

The holder of an exploration or production right must ensure that he/she is possession of all of the necessary environmental authorizations/approvals, permits and licenses in terms of the relevant legislations/regulations before commencing with drilling operations. Further to these permits, a holder must have submitted and received approval from the Agency on the following documentation. The holder should not, under any circumstances, start with drilling operations, without obtaining written approval from the Agency on the following documents:

- Well Engineering Design and Construction Plan
- Drilling Plan
- Well Examination Plan
- Well Decommissioning /Abandonment Plan

For wells which will be subjected to hydraulic fracturing, the right holder in addition to the aforementioned documentation must also submit the hydraulic fracturing programme, which must at a mimimum contain the following information:

- Pre-fracturing simulation and modelling of the expected fractures performed by an engineer with sufficient experience and knowledge in hydraulic fracturing
- Prognosed depths to the targeted formation`s top and bottom depths
- Authorised source and volume of water to be used
- Handling, storage, re-use, transportation, treatment and disposal of hydraulic fracturing fluids and flow-back
- Fracturing fluids compositions, concentrations and estimated total volume to be used

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- Micro seismic monitoring programme

3.1 DRILLING PLAN

The drilling plan must include the detailed information on the planned drilling operations including the type and class of the material to be used. The following information, should as the minimum requirement, be included in the proposed Drilling Plan:

- Well Schematic plan including well bore sizes for all the planned sections
- Casing Programme
- Cementing Programme
- Mud Program
- Cementing procedures
- Type of drilling fluids in each section of the well
- Drill Bits type and sizes
- Well Control Measures
- Cement type and grout mixture

3.1.1. WELL ENGINEERING DESIGN DOCUMENT

Well Engineering Design document has to describe in details the all the operational, health, and environmental risks, the proposed well poses, and set forth a detailed plan for mitigating and controlling these risks. The main purpose of this document is ensure that wellbore and equipment integrity, and drilling operational procedures can be executed at the risks as low as reasonably practicable, meeting both well objectives and on the other hand, complying with the specifications and standards set out in the relevant regulations. This document has to specify, with justification from engineering calculations and considerations conducted by a competent drilling engineer, the detailed Well Construction Plan, materials to be used in the drilling of the well, casing and grouting of the well, and the well control measures to put in place.

The following should be considered at the well design stage and form part of the Well Engineering Design Document:

- The purpose of the well
- The hydrocarbon type expected
- Expected formations temperature and pressure
- Production method to be used (in case of production wells)
- Proximity of planned well path to other wells
- Potential hazardous formations
- A schematic section of the well bore including all sections and planned borehole sizes
- Type of Rig to be used
- Drilling method or technique
- Type and estimated of drilling fluids for the well
- Type of Well Completion, and if applicable, perforation design
- Type of Well Stimulation, if planned

The Well Engineering Design document should also include the planned tests to be carried out in ensuring that the material used, and the techniques or methods to be applied during and post drilling operations do meet the required standards as prescribed in either the regulations or in published recommended best practices guidelines such as the American Petroleum Institute or others. Details on the information to be included in the Well Design Document can be obtained from the "Well Construction Plan" guidelines, available in Technical Compliance Department with Regulation Division at the Agency.

3.1.2. WELL EXAMINATION PLAN

Well Examination Plan is essentially a plan that provides for an independent check on well design, construction, operation, maintenance, and suspension and abandonment operations. This plan must be submitted to the Agency before drilling can commencement of drilling, and it must provide details on the following:

- A detailed plan of examinations to be carried out during and post well construction for well integrity purposes.
- In cases of wells to be hydraulically stimulated, in addition to well integrity examination plan, a detailed plan of induced seismicity monitoring during and post well operations must be included in the well examination plan

3.1.3. WELL DECOMMISSIONING OR ABANDONMENT PLAN

The well operator must make sure that the well is designed and constructed such that both future suspension and abandonment of the well will neither pose any risk to the environment nor compromise the integrity of the well. The Well Decommissioning or Abandonment Plan can either be submitted as part of the Well Construction Plan/Design or separately. This plan must at a minimum take into account the following aspects of Well Design and Construction:

- The planned cement height in annulus outside casing
- Prognosed permeable formations outside the casing that must be covered by cement
- Cementing casing overlaps
- Extent and the need for plugs to cover full diameter of the hole
- Fluid type in annuli above cement;
- The ease of injecting the cement into the annulus

4. NOTIFICATIONS AND APPROVAL OF SPECIFIC WELL ACTIVITIES

The holder should notify the Agency at least two days prior to commencement of the following:

- Spudding of the well
- Lowering of Casing strings
- Grouting of the well
- Casing strings compression tests (mechanical integrity tests)
- Formation Pressure Tests
- Testing and Installation of Blow-Out Preventing Equipment
- Flow testing the well