



1 Introduction

This document provides the criteria to be used for assessing applicants under the general area of practice of Petroleum Engineering. Engineers Australia has applied to the Queensland Government for Petroleum Engineering to be included as an area of engineering for registration as a Registered Professional Engineer of Queensland (RPEQ) under **Part 2** of the *Professional Engineers Act 2002* (QLD).

A Competency Panel sets and maintains the eligibility criteria and assessment methodology for registration, including the conduct of compliance audits, and produces and maintains this Guideline. In developing this Guideline, the Competency Panel used competency matrices provided by the Society of Petroleum Engineers and agreed by Engineers Australia.

Assessment of applications for registration is by an Assessment Panel, established by the Competency Panel, made up of experienced current practitioners.

Administration of this registration scheme is by the Associate Director Registration, Engineers Australia.

2 Background to Petroleum Engineering

Petroleum Engineering is multidisciplinary in nature and is the engineering science focussed on achieving optimal integrated exploration and production of oil and gas upstream of petroleum refineries. Petroleum Engineers may evaluate potential oil and gas reservoirs, oversee drilling and completion activities, select and implement improved recovery schemes, and design surface collection and treatment facilities. Petroleum Engineers fall within the following three main sub-disciplines and include the following breadth of interests:

Reservoir

- Reservoir geosciences
- Oil and gas reservoir drive mechanics
- Fluid properties
- Single and multiphase flow in porous media
- Methods of estimating reserves and recoveries
- Reservoir development techniques
- Water and gas injection
- Enhanced oil recovery
- Coal bed methane and shale gas recoveries
- Reservoir numerical simulation concepts
- Analysis of tight gas reservoirs
- Methods to determine net pay
- Formation logging methods and measurements
- Well testing, including drill stem tests
- Coring and core analyses
- Mud logging

Drilling

- Casing and tubulars
- Drilling fluids, hydraulics and solids control
 - Directional and horizontal drilling
 - Well control
- Rig equipment and capabilities
- Well cementing
- Drilling mechanics
- Wellheads
- Drilling bits
- Offshore operations
- Underbalanced drilling

Production

- Perforation
- Completion and work-over fluids
- Well completion systems
- Well integrity assurance
- Inflow performance analysis
- Fracture treatments, including acid fracturing
- Matrix acid treatments
- Tubing and downhole equipment
 - Sucker rod pumping systems
- Gas lift, including intermitters and plunger lifts
- Progressive cavity and electric submersible pumps
- Production logging
- Squeeze cementing
- Plug and abandonment requirements and processes
- Remedial, recompletion and intervention operations
- Coiled tubing and snubbing operations
- Selection of piping to accommodate flow rate, total pressure and pressure drop, including nodal analyses
- Compressor applications
- Onsite processing equipment
- Onsite storage vessels, including piping, valves, and venting
- Custody transfer metering devices
- Produced fluid treatment

Accredited or recognised Petroleum Engineering degree courses are established in Australia and overseas; however, many applicants seeking registration as Petroleum Engineers will have academic qualifications and professional experience in other engineering fields at some stage. Such applicants will need to show that they have received adequate training and experience, understand an appropriate breadth of petroleum engineering activities, and have practised independently or under general direction as Petroleum Engineers. Literature published by the Society of Petroleum Engineers will be helpful in preparing an application for registration on NPER or as an RPEQ.

3 Areas of Competencies

Specific areas of competencies for assessment are:

1. Maintain pressure control of wells by calculating fluid weight necessary to maintain well control and procedures to kill wells.
2. Develop casing programs based on pore pressure/frac gradient plots and understanding the relationship between desired production flow rates and tubing/casing configuration.
3. Design surface, intermediate and production casing/liner to maintain well integrity.
4. Protect fresh water aquifers with surface casing and suitable cement programs.
5. Design a directional well path by understanding the relationship between the location of subsurface targets, drilling difficulty, lateral displacement and formation properties.
6. Determine wellhead and blow out preventer (BOP) ratings to maintain well integrity.
7. Understand performance properties of drill string and bottom hole assembly (BHA) components.
8. Develop and implement formation evaluation programs to manage the interaction between mud composition, hole integrity and types of logs that can be run successfully.
9. Develop drilling hydraulics program and optimize bit hydraulics.
10. Monitor drilling operations and optimize overall drilling performance.
11. Determine formation properties (porosity, saturation, net pay) and lithology from well logs.
12. Design well testing programs to determine reservoir properties.
13. Determine reservoir properties (drainage area, pressure, permeability, skin, and distance to boundaries) from well test analysis.
14. Determine fluid densities, fluid contacts, and productivity from wireline formation tests.
15. Design bottomhole and surface sampling procedures to obtain representative reservoir fluids.
16. Design fracture and acidizing stimulation treatments.
17. Develop workover procedures involving fishing, squeeze cementing and recompletion.
18. Design appropriate wellbore and flowline configurations given initial and projected reservoir inflow performance, surface conditions and produced fluid constituents through nodal analysis.
19. Demonstrate understanding of the various options to assist in lifting produced liquids, the ranges of pressure and fluid volumes for each lift option, and the hydraulic and mechanical forces associated with artificial lift.
20. Interpret and incorporate data from production logging operations into the design and implementation of completion, remediation, and plug back operations.
21. Provide field production surveillance by accessing essential data and provide ideas for improved well and reservoir production.
22. Understand and apply basic and special core analysis.
23. Perform reservoir characterization through routine core analysis in identifying net pay and fluid contacts.
24. Conduct log analysis and interpretation.
25. Understand the principles of phase behaviour to distinguish the general properties of black oil, volatile oil, gas condensate and dry gas reservoir fluids.
26. Determine initial oil or gas in place from rock and fluid properties and geologic isopach maps.
27. Apply relevant oil and gas reserves definitions.
28. Perform oil and gas recovery estimates.
29. Apply principles of drive mechanisms, material balance, pressure maintenance, recovery estimating, decline analysis and volumetrics to determine oil reservoir performance.
30. Use drive mechanism, material balance (gas and condensates) for recovery estimation, decline analysis, and volumetrics to understand fluid flow characteristics and gas reservoir performance.
31. Determine reservoir fluid recovery under secondary or improved and tertiary or enhanced recovery mechanisms.
32. Apply recovery processes to nonconventional gas reservoirs.
33. Evaluate reservoir performance using reservoir simulation.
34. Apply decision and risk analysis to estimate recovery factor and reservoir performance predictions.

4 Eligibility Requirements for Registration

Applicants must possess an academic qualification in engineering (for example, a four year engineering degree), accredited or recognised by Engineers Australia, or equivalent overseas qualification. Applicants must also be able to satisfy the Australian Engineering Competency Standards Stage 2 for Professional Engineers.

In addition to their qualifications and experience, applicants will need to demonstrate:

- That Petroleum Engineering is a significant part of their professional employment or practice, and
- That they practise independently or under general direction as Petroleum Engineers in at least one of the three main sub-disciplines outlined in 2 above.

5 The Application & Assessment Process

5.1 Making an Application

The following sections indicate what you must do to apply for registration on NPER in the general area of practice of Petroleum Engineering or to apply for assessment of qualifications and competencies under **Part 2** of the *Professional Engineers Act 2002* (QLD).

You do not need to join Engineers Australia to register on NPER or apply for assessment for RPEQ.

5.2 Required Documents

All applicants must complete the **Supplementary Form** attached to this Guideline, in addition to your application for registration or assessment on NPER (Ref A1¹).

If you are registered, licensed or chartered as a Professional Petroleum Engineer as a member of a professional association with which Engineers Australia has a **Mutual Recognition Agreement (MRA)**, you may apply for registration on NPER – Petroleum Engineering using the [Mutual Recognition Agreement](#) application form. Requirements for a verified CV and record of continuing professional development under an MRA apply. The MRA form will enable you to obtain Chartered Membership (CPEng) of Engineers Australia, if you wish. If you do not wish to join Engineers Australia at this time, please mark on the form that you require registration on NPER or assessment for RPEQ.

If you are a CPEng or registered on NPER in another area of practice, you may apply for registration on NPER – Petroleum Engineering using the form for an [Application for Registration on NPER](#). You may apply for assessment for RPEQ using the [Application for Assessment](#). In each case, you must submit a Statement of Experience that shows how you satisfy the eligibility requirements (4 above) and your CPD Records in Petroleum Engineering. If your academic qualification is in a field other than Petroleum Engineering, you must also show in your Statement of Experience and your record of continuing professional development (CPD) that you have received adequate academic and practical formation in the sub-discipline(s) of Petroleum Engineering selected in **A3**. on the **Supplementary Form**. You must ensure the application includes verified evidence of your:

- Formal education and training in Petroleum Engineering – curricula of academic awards, etc.
- Supervised experience in Petroleum Engineering
- Responsible experience as a Petroleum Engineer.

You must obtain verification of your evidence by an experienced professional engineer familiar with your work.

If you are not included in the two groups above you must follow the guidance on preparing an Engineering Practice Report (EPR) in the [Chartered Status Applicant's Handbook](#), (even if you do not intend to join Engineers

Australia). You must use the application form in the handbook and state that you are applying for NPER – Petroleum Engineering and you must attach the **Supplementary Form** to it. The same process will also allow you to obtain Chartered Professional Engineering Membership (CPEng) if you wish to join Engineers Australia. In addition to satisfying the Australian Engineering Competency Standards Stage 2, your EPR must provide evidence of your:

- Formal education and training in Petroleum Engineering – curricula of academic awards, etc.
- Supervised experience in Petroleum Engineering
- Responsible experience as a Petroleum Engineer

If you are applying only for assessment for RPEQ in the area of Petroleum Engineering, you must follow instructions on the [Application for Assessment](#). Please note that instructions refer to the [Chartered Status Applicant's Handbook](#). Your EPR must provide evidence of your:

- Formal education and training in Petroleum Engineering – curricula of academic awards, etc.
- Supervised experience in Petroleum Engineering
- Responsible experience as a Petroleum Engineer

All applicants must provide clear evidence that they have worked competently across at least one of the main sub-disciplines within Petroleum Engineering, and show that they meet the eligibility requirements described in this Guideline. Your documents must be reviewed and verified by an experienced professional engineer as being a true representation of your recent responsibilities.

5.3 Assessment

All applicants will be assessed against the areas of competency (3 above) in Petroleum Engineering to ensure that they possess the required competencies for the sub-discipline(s) selected in **A3**. of the Supplementary Form.

If you are a CPEng your Statement of Experience and record of continuing professional development (CPD) will be analysed by the Petroleum Engineering Assessment Panel for evidence that you meet the requirements for NPER - Petroleum Engineering (4 above). You may be invited to attend an interview with the Assessment Panel, as explained on the NPER application form.

If you are not a Chartered Professional Engineer (CPEng) and not covered by an MRA, you will be assessed for registration as explained in the [Chartered Status Applicant's Handbook](#). When your Engineering Practice Report is accepted, you will attend a Professional Interview lasting about one hour as explained in the Handbook. At least one of the interviewers will be a Petroleum Engineer experienced in your sub-discipline.

Send your **Supplementary Form** for registration on NPER - Petroleum Engineering the relevant application form (**A1.**), together with all relevant attachments and fees, to: Associate Director Registration, Engineers Australia, 11 National Circuit, Barton, ACT 2600.

¹ For A1, A2 etc see Supplementary Application Form attached

Applicant's Name EA Reference No.

A1. Application Forms to use with this Supplementary Form

All applicants must complete and attach this Supplementary Form to the relevant application form (5.2 above):

- Applicants covered by a Mutual Recognition Agreement use the form in the [MRA Application](#)
- Members with CPEng or NPER in another area of practice use the [Application for Registration on NPER](#)
- Applicants also applying to be Chartered Professional Engineer (CPEng) use the form in the [Chartered Status Applicant's Handbook](#)
- Applicants for assessment of qualifications and competencies for RPEQ use the [Application For Assessment](#).

A2. Responsible Position in Petroleum Engineering (summary)

I have provided professional services independently, or under general direction, in Petroleum Engineering in the following positions (provide dates, employer and position title only here):

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Please provide, in your Statement of Experience, details of these positions, stating the functions you performed and the responsibilities you accepted. (If there are insufficient lines, attach a separate summary sheet for **A2**.)

A3. Professional Practice in Petroleum Engineering

You must demonstrate that you practise in at least one of the main sub-disciplines (reference Section 2 of the Guideline). Please select below.

- Reservoir Engineering
- Drilling Engineering
- Production Engineering

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Please also list your areas of competence (reference Section 3 of the Guideline) against your selected sub-discipline(s) of Petroleum Engineering. Assessors will look for evidence in your supporting documents to substantiate these claims of competence and to ensure the required competencies are demonstrated.

A4. Certification

This summary of my professional involvement in Petroleum Engineering and the details reported in my Statement of Experience and other supporting documents are true and correct in every particular and I have made claims of acquired competencies in good faith.

Signed Date/...../.....