



Petroleum Decommissioning Guideline



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1. Purpose

The aim of this guideline is to provide uniform regulatory guidance on the obligations, as described in the relevant Acts and Regulations, of registered petroleum title holders (registered holders) preparing to engage in decommissioning activities.

Registered holders should be familiar with those sections of these Acts (see section 3.2 of this document) and regulations relevant to decommissioning. Some sections are discussed in these guidelines to expand on the obligatory requirements. In all situations outcomes should be 'industry best practice' and seek to apply innovative, developing technologies to improve the ultimate recovery of resources.

These guidelines should assist registered holders, both onshore and offshore Western Australia, in ascertaining their broad obligations in the assembly and submission of a decommissioning program, including its wells and associated facilities/infrastructure/pipelines. The decommissioning program should include appropriate environmental and safety considerations.

The Department of Mines, Industry Regulation and Safety (DMIRS) is the regulator for safety, environmental and resource management for petroleum activities in the State of Western Australia.

DMIRS, as the primary point of contact, will facilitate meetings between the registered holder and all other government stakeholders to formulate a whole-of-government approach for the approval of submitted decommissioning programs by the registered holder.

2. Background

The word 'decommissioning' simply means to 'take out of service' and is not generally defined in legislation. This may be a contributing factor to its confusion with terms such as 'removal' and 'disposal', which are two possible processes applied in decommissioning, and sometimes also with 'abandonment'.

For the purposes of this guideline, decommissioning is broadly defined as the controlled process of retiring a petroleum operation from service in a manner that is safe and environmentally responsible, followed by the regulated removal of property from the licence or permit area, and the rehabilitation of the environment to an approved state. Decommissioning can also be the partial or progressive removal of facilities from a field as conditions change, or offtake rates decline, and the ultimate cessation of production is foreshadowed.

In other parts of the world, decommissioning is a rapidly developing industry in its own right. In Western Australia, the level of maturity of fields is generally less than in other jurisdictions and there are proportionately fewer fields that are yet to reach their economic limit and cease production. Nevertheless, more fields are now being identified to be approaching the end of their life and preparatory arrangements for decommissioning are being made.

The increasing importance of decommissioning is irrefutable, not least because of the high costs involved which impact on the economic limits and life of a field. It is important to recognise that early planning of a field's development should include close consideration of decommissioning options. The high cost burden of decommissioning at the end of a field's life has to be factored into projections of its economic limit and the time to cessation of production. Field development options will provide for different decommissioning scenarios. A cost benefit assessment, which includes projected decommissioning costs, will provide the means to objectively select an optimal field development to maximise ultimate recovery.

It has to be recognised that early planning of a field's development should consider decommissioning options that can lead to considerable reductions in costs, and increased reserve recoveries. In reality, for a number of fields in Western Australia, decommissioning programs have only received comprehensive attention late in their life. As understanding becomes more focussed, the broad issues surrounding decommissioning are now being acknowledged and progressively assessed. These guidance notes form part of that process.

Decommissioning is a 'significant activity' in terms of field management. The regulator requires a record to be maintained of all significant activities that relate to field management issues, including projections of petroleum production and forecast field closures and plans for decommissioning. Under regulations, a field management plan (FMP) details how a field will be decommissioned. Petroleum wells are decommissioned under a well management plan (WMP).

In the upstream oil and gas industry, the decommissioning process was previously referred to as 'abandonment' or in the case of a well, 'plugged and abandoned' (P&A). These expressions continue to appear in the literature. However, there is now widespread acceptance of 'decommissioning' as the process since 'abandonment' has connotations of things being left behind, or forgotten.

3. Western Australian Legislative and Regulatory Framework

Petroleum activities in Western Australia are legislated under the *Petroleum and Geothermal Energy Act 1967* (PGERA 67), the *Petroleum (Submerged Lands) Act 1982* (PSLA 82) and the *Petroleum Pipelines Act 1969* (PPA 69). Regulations under these Acts encompass environment, safety and resource management. Figure 1 provides an overview of the legislation and regulations, and the mechanisms for conducting activities in Western Australia, including decommissioning activities.

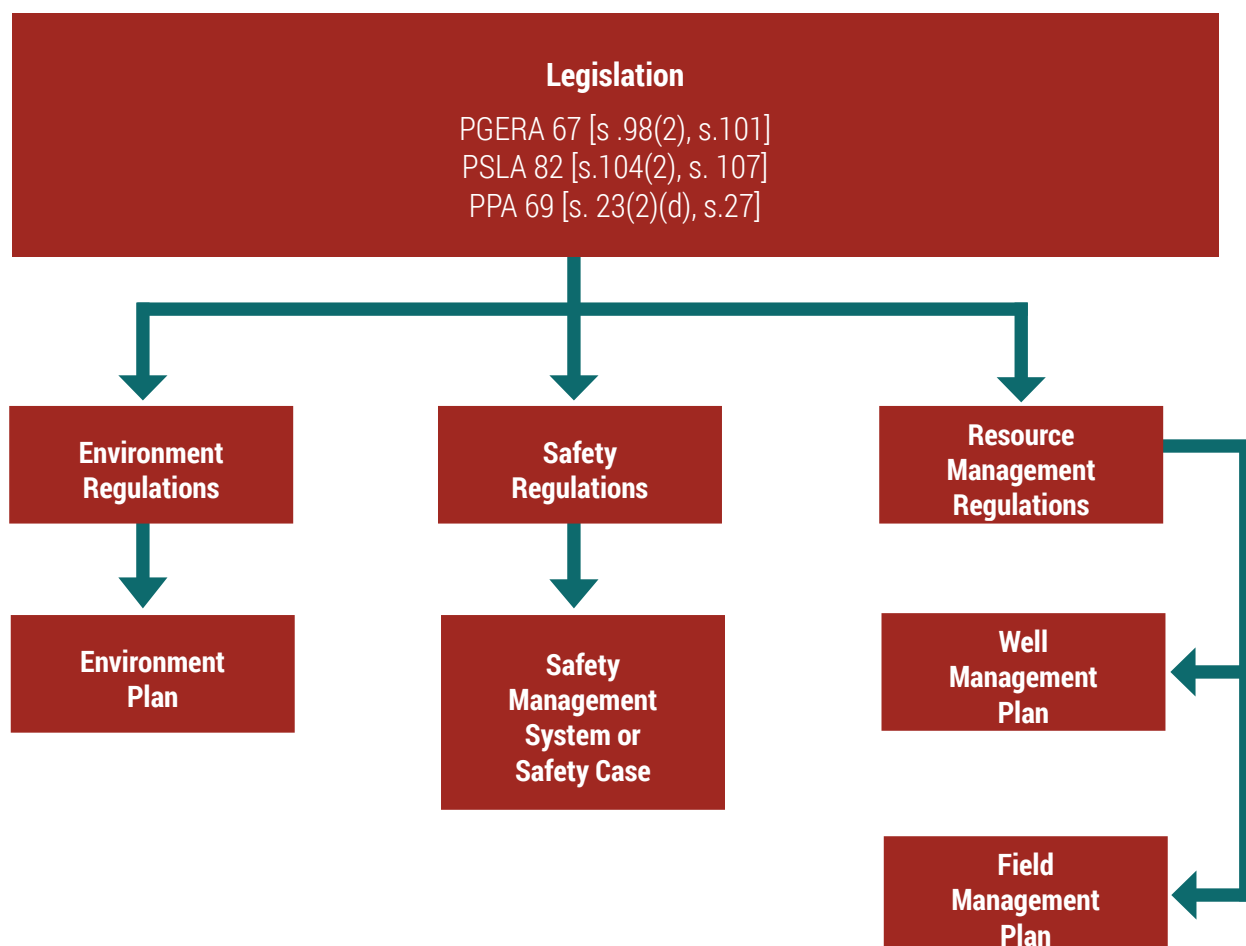


Figure 1. Western Australian petroleum legislation, regulation and plans applicable to decommissioning activities

3.1. Regulatory Overview

The first point of contact in the pursuit of Ministerial approval for a decommissioning program will be with DMIRS through the Minister's delegate. A decommissioning program may deal with the decommissioning of all the facilities located on a petroleum title or parts of the facilities, including a single installation or pipeline.

The decommissioning of onshore and offshore petroleum fields and facilities have their legislative controls through the provisions of the PGERA 67 and the PSLA 82 with their subsidiary regulations.

Decommissioning activities are regulated through the submission and approval of revised Field Management Plans (FMP), Well Management Plans (WMP), Environment Plans (EP) and Safety Cases (SC) or Safety Management Systems (SMS).

The decommissioning of pipelines is administered under the PPA 69 and PSLA 82, and their related regulations. Similarly, EPs and SCs are required for pipelines.

There is extensive national and international legislation which may be relevant to decommissioning activities in Western Australia (see section 7). The first point of contact for any queries will be through DMIRS, which will coordinate the referral of queries to the appropriate agency, for example, to the Office of the Environmental Protection Authority (OEPA), part of the Department of Water and Environmental Regulation (DWER).

3.2. Relevant Western Australian Legislation and Regulations

The Western Australian legislation includes the following Acts with underlying regulations that may be involved in decommissioning activities:

- *Petroleum and Geothermal Energy Resource Act 1967*
- *Petroleum and Submerged Lands Act 1982*
- *Petroleum Pipelines Act 1969*
- *Petroleum and Geothermal Energy Safety Levies Act 2011*
- *Radiation Safety Act 1975*
- *Health Act 1911*
- *Rights in Water and Irrigation Act 1914*
- *Wildlife Conservation Act 1950*
- *Conservation and Land Management Act 1984*
- *Contaminated Sites Act 2003*
- *Dangerous Goods Safety Act 2004*
- *Planning and Development Act 2005*
- *Land Administration Act 1997*
- *Environmental Protection Act 1986*
- *Shipping and Pilotage Act 1967*
- *Jetties Act 1926*

Together with their respective regulations, these Acts collectively provide the legal framework for a decommissioning program both onshore and offshore.

3.3. Well Management Plans (WMP)

The petroleum resource is managed under the Petroleum and Geothermal Energy Resources (Resource Management and Administration) Regulations 2015 (PGER RMAR 2015) and the Petroleum (Submerged Lands) (Resource Management and Administration) Regulations 2015 (PSL RMAR 2015), administered by DMIRS, which define and regulate WMPs. These regulations are collectively known as RMAR 2015.

The decommissioning of wells forms an integral and initial part of a field's decommissioning activities. Registered holders must have approved WMPs in place for activities to occur on wells. Revisions to the WMP must be approved for each new activity that is planned for a well. Decommissioning is the final activity in the life of a well and therefore the final revision to the WMP will be the decommissioning program.

3.4. Field Management Plans (FMP)

The RMAR 2015 also define and regulate FMPs. FMPs are the plans used to manage producing petroleum fields throughout their production life until final decommissioning of the fields. Under s.41 of the RMAR 2015 regulations, it is a requirement that a registered holder has an approved FMP before recovery of petroleum can be undertaken. FMPs are required to include a description of decommissioning plans. Changes to how a field is being managed necessitate the approval of revisions to the FMP for that field. These revisions will include updates of the decommissioning program and any changes to estimated recovery or estimation of earlier cessation of production (CoP) than had been provided previously, as required under regulations.

Logically, final planning for decommissioning is required to commence well before permanent CoP, while the field is still generating cash flow. For comparison it is a requirement in the UK and Norwegian jurisdictions for decommissioning planning to commence up to five years prior to the estimated date of permanent CoP. Actual timing will be dependent on a field's size and complexity.

Plans for the partial removal or decommissioning of property prior to CoP requires approval by the Minister or his delegate where these are considered significant activities.

Where a field to be decommissioned does not have an FMP because it is not recovering petroleum, a decommissioning program would be requested by DMIRS.

3.5. Environment Plans (EP)

All petroleum activities under PGERA 67, PSLA 82, and PPA 69 in Western Australia are required to have an approved EP.

The environmental aspects of decommissioning activities are administered by DMIRS under the following regulations, collectively referred to as 'the Environment Regulations':

- Petroleum and Geothermal Energy Resources (Environment) Regulations 2012
- Petroleum (Submerged Lands) (Environment) Regulations 2012
- Petroleum Pipelines (Environment) Regulations 2012

Regulation 4 of the Environment Regulations defines 'petroleum activity' as any works or operations carried out under a petroleum instrument, including decommissioning, dismantling or removing a facility or pipeline. A petroleum activity cannot commence until the EP for the activity has been approved by DMIRS and an oil spill contingency plan is required to mitigate any potential spill incidents to the natural environment.

The objective of the Environment Regulations is to ensure that any petroleum activity in the State is conducted in a manner consistent with the principles of ecologically sustainable development and in accordance with an EP. The EP must demonstrate that the environmental impacts and risks of the decommissioning activity will be reduced to ALARP (as low as reasonably practicable).

Once decommissioning of infrastructure has been undertaken, the registered holder/operator must restore the petroleum title area to its pre-activity state, unless otherwise agreed with DMIRS.

For onshore decommissioning programs, the operator must set rehabilitation completion criteria. The completion criteria should be outlined in the EP and be specific with measurable targets. For example, completion criteria may relate to the stability of landforms, percentage cover of vegetation, and diversity of species compared to the surrounding area.

Post decommissioning of an offshore facility, operators may be required to undertake environmental monitoring (particularly where infrastructure is partially decommissioned or decommissioned in-situ) to confirm that impacts have been reduced to ALARP.

For further information on the EP, please refer to the 'Guideline for the Development of Petroleum and Geothermal Environment Plans' (2016) available on the DMIRS website. Guidance on the development of an onshore oil spill contingency plan is also available on the website.

3.6. Safety Case (SC) or Safety Management System (SMS)

All petroleum activities, including decommissioning, are required to have an approved SC under the PLSA 67 and PPA 69, or an SMS under the PGER 67. This must also cover any activities associated with the operation, such as environmental monitoring and rehabilitation.

Operators are encouraged to discuss safety management with DMIRS (Dangerous Goods and Critical Risk Safety Division) when preparing their plans. Safety levies, as set through the *Petroleum and Geothermal Energy Safety Levies Act 2011*, remain in place during the decommissioning and rehabilitation stage.

The registered holder is responsible for ensuring that throughout the entire decommissioning and rehabilitation process, there is an approved SC or SMS in accordance with the relevant legislation. The scope of coverage of these is not limited to the removal of infrastructure but includes all activities necessary to fulfil the operator's obligations and commitments to DMIRS (such as environmental monitoring, rehabilitation works and the like). All activities being undertaken by the operator and any contractors need safety management (SC or SMS).

When developing the scope of any decommissioning/rehabilitation program, operators are encouraged to engage with DMIRS as early as possible to identify areas of concern.

4. Infrastructure

4.1. Pipelines and Flowlines

The decommissioning program for pipelines and associated infrastructure/equipment should be covered in EPs and SCs, although they may be submitted as part of an FMP. This may occur where the pipelines:

- connect producing petroleum fields to offshore or onshore processing facilities
- service multiple fields
- cross a range of boundaries from an ownership, regulatory or interest perspective.

The decommissioning of infield flowlines (from wells to processing facilities) or offshore and onshore production fields should be covered entirely in FMPs.

When decommissioning offshore, pipelines and associated equipment on the seabed are normally required to be removed and taken onshore for disposal or recycling. A subsea pipeline licence granted under the PSLA 82 covers that part of the pipeline that extends from the mean low water mark on the Western Australian coast to the three nautical mile limit. Where the pipeline extends beyond the three nautical mile limit, that part of the pipeline is regulated under the *Offshore Petroleum and Greenhouse Gas Storage Act 2006* (OPGGSA 06) and administered by the National Offshore Petroleum Titles Administrator (NOPTA) on behalf of the Joint Authority.

Any damage to the seabed or substrate is expected to be remediated. Section 104(2)(c) of the PSLA 82 states that the Minister cannot give his consent to the surrender of a licence, unless the registered holder has had all equipment, infrastructure, etc., removed from the licence area. The pipeline licence remains in force, leaving the registered holder responsible for the integrity and maintenance of the pipeline.

However, s.104(3) of the PSLA 82 also allows the Minister to accept alternative decommissioning outcomes to that of full removal of all property. This means that registered holders may consider alternative decommissioning options such as where removal may be delayed or where the registered holder plans to leave any part of the pipeline in place. However, any plans should be discussed with DMIRS (or the Joint Authority when the pipeline falls both in WA's jurisdiction and that of NOPTA) prior to undertaking any lengthy planning.

4.2. Facilities

Provisions for the decommissioning of offshore infrastructure facilities and the subsequent surrender of the licence are made in s.104 of the PSLA 82 and its PSL RMAR 2015 regulations.

Please note: Prior to 2010, offshore facilities (eg. production platforms) used for the recovery of petroleum in a licence area in WA waters were covered by the production licence granted under the PSLA 82 or PGERA 67. As from 2010, the requirement for an Infrastructure Licence was inserted as s.60B of the PSLA 82, (p. 87).

Major offshore infrastructure that requires decommissioning at the end of a project may include the following components:

- surface infrastructure – concrete and steel platforms including topsides and jackets
- floating installations – floating production facilities (FPSOs)
- subsea systems – wellheads, production modules, anchors, CGSs, mattresses
- pipelines – trunklines, rigid flow lines, flexible flowlines, umbilicals
- risers and turret moorings

A practice that has occurred in some jurisdictions, commonly termed 'rigs to reefs', is to convert decommissioned offshore petroleum facilities into artificial reefs. Some options can include leaving platform jackets partially in-situ or moving them to a different location.

Considerable scientific research is being invested into the pros and cons relating to these practices, which have complex implications. Any derogation application involving rigs to reef concepts needs to be supported by in-depth research studies that input to the recommendation, including the assessment of future pollution risks and ultimate liabilities of continued maintenance of the facility.

In some circumstances, the removal of property may be shown to have a greater detrimental impact than leaving it in place. The removal of pipelines may present such circumstances.

5. Decommissioning Planning

As highlighted previously, the first point of contact in the pursuit of Ministerial approval for a decommissioning program will be with DMIRS through the Minister's delegated authority. An FMP revision may deal with the decommissioning of all of the facilities located on a field or part of the facilities including a single installation or pipeline. A WMP revision will deal with how an individual well will be decommissioned. EPs and SCs or SMSs will deal respectively with environment and safety aspects.

The planning and updating for the decommissioning program should commence some time prior to the estimated time to permanently cease production as part of the FMP revision process. This may extend up to four or five years before ceasing production in the case of large offshore operations. Smaller onshore fields will be on a reduced time scale because of their lesser complexity.

A program for decommissioning will provide for the actual removal and remediation project and will involve close consultation between the registered holder and DMIRS, as the first point of contact in the regulatory process. The diverse nature of fields, their location and their development facilities normally will require that decommissioning issues will be treated on a case-by-case basis by DMIRS officers assessing proposals for decommissioning.

Normally an FMP seeks to maximise the recovery of petroleum. Therefore, if premature decommissioning is considered, risks associated with the stranding of resources need to be carefully assessed. DMIRS expects registered holders to demonstrate that production enhancement technologies and potential changes to the field management processes were thoroughly researched and that there were no other viable options other than to decommission.

Remaining reserve estimations and life-of-field projections for a given petroleum resource are subjective and will fluctuate over time. However, they will become better defined as the field matures.

FMPs should include information relating to projections of recovery and field life. When field production rates become uneconomic, the field is deemed to have reached an economic limit. This may result in either a temporary, long-term suspension of production operations, pending a transition back to viable operations, or be considered as a terminal state, ultimately leading to decommissioning. DMIRS needs to be kept informed about changes in forecast recovery rates.

5.1. Planning to Decommission Offshore Facilities

There are a number of possible options for decommissioning offshore infrastructure, as highlighted in Figure 2.

When alternative options, such as leaving infrastructure in place, are the preferred course of action, the registered holder must be able to demonstrate that all feasible decommissioning and removal options have been considered and a comparative assessment made, taking into consideration risks associated with the environment and safety, as well as social and economic implications. Future ownership and liability for the decommissioned infrastructure will also need to be determined.

5.2. Risk Assessment

Where multiple, alternative options for decommissioning are possible, a process of comparative risk assessment should be followed to determine the optimal outcome. There should be alignment with relevant international or Australian standards that model the process and have linkage to common risk concepts applied in safety and environment regimes (eg. ALARP, "acceptability").

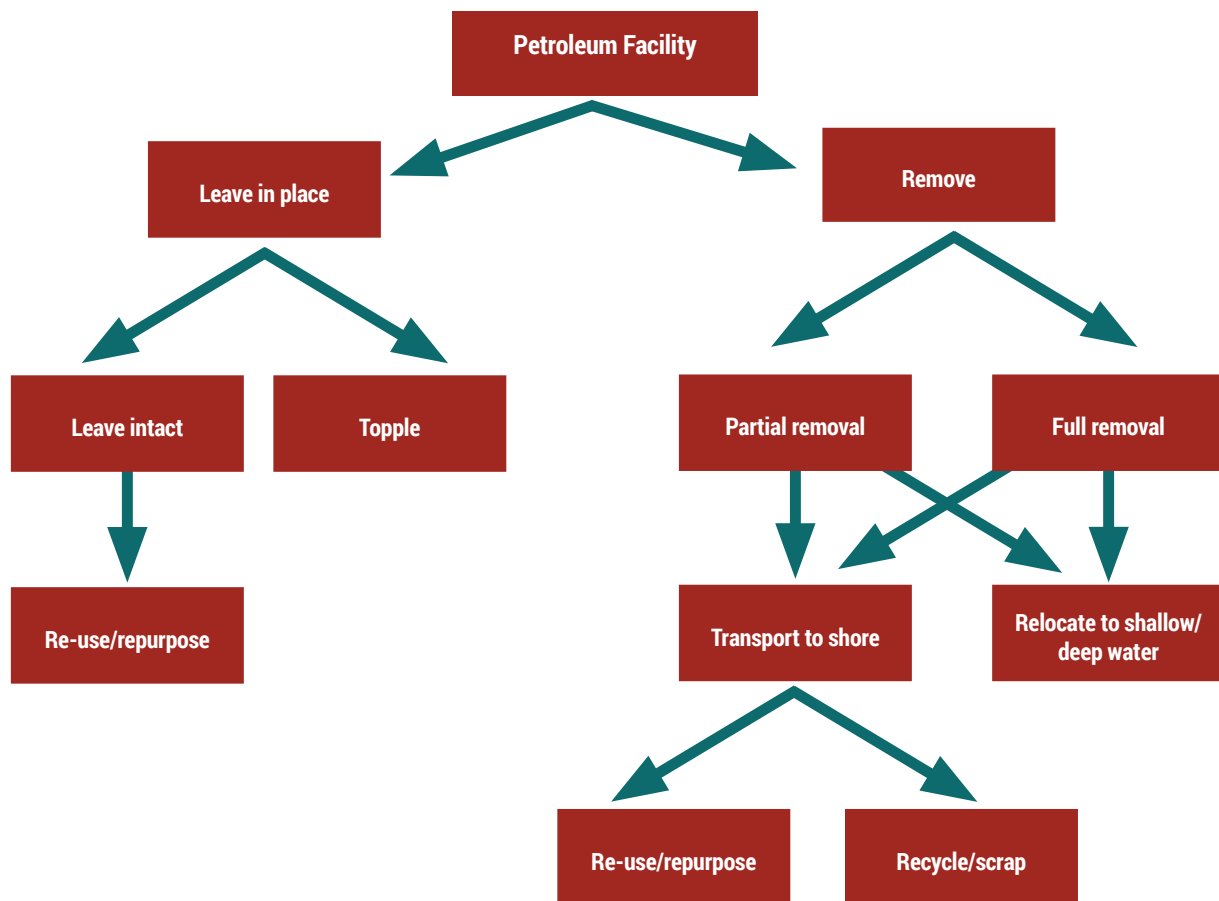


Figure 2. Decommissioning options for offshore facilities

5.3. Cost / Benefit Assessment

There should be an overall cost estimate in Australian dollars of the decommissioning options and an indication of the basis on which the estimate is made.

If it is anticipated that decommissioning work will span a number of years, expenditure should be split by year. In cases with more than one facility, expenditure should be split by facility.

It is recognised that in some cases accurate costings and confirmation of the final decommissioning option are dependent on the outcome of a commercial tendering process.

5.4. Recovery Assessment

An ultimate goal in field management is to maximise the recovery of resources before initiating CoP and plans to decommission. The detailed, final planning for decommissioning should commence in advance of recovery of petroleum reaching an economic limit and CoP. This will normally occur during the late production decline phase of the field's life. This is usually some years prior to CoP in the case of larger offshore operations, which carry a higher level of complexity in planning than onshore fields.

During this late time, the field will still be generating cash flow. Decommissioning costs will necessarily factor into determining when production should cease permanently. This is an iterative process, repeated when significant changes are made to a field's operating configurations that affect the recovery of petroleum.

5.5. Comparative Assessment

A comparative assessment approach should be used to identify the best decommissioning options for specific assets. Options are not limited to the following discussion.

Evaluation should include an assessment of complexity and associated technical risk, risks to personnel, environmental impact, effect on safety of navigation, other users, and full social and economic considerations.

Derogation considerations will be performed on a case-by-case basis. Where multiple alternative options for decommissioning are possible, a process of comparative risk assessments will be followed to determine the optimal outcome. These assessments will consider the risks, benefits and feasibility issues, including environmental impact studies. Each consideration, with its options and conditional parameters will be the subject of agreement between DMIRS and the registered holder. The use of decision tables is an established practice to model complicated logic where all possible combinations of conditions are considered.

The base case applied in this comparative assessment process will be the complete removal of all property and the restoration of the licence area to its original condition. Note: In the UK, North Sea, the frequency of decommissioning programs involving complete removal is significant.

The extent of any derogation will be dependent on the circumstances specific to a licence area, or a field within a licence area, and subject to approval by the Minister.

A derogation example might be that the removal of a facility or pipeline may create more environmental damage than leaving it in place, such as where pipelines have become buried and will stay buried.

5.6. Re-use and Phasing

Particular consideration should be given to the possibility for re-use (including gas storage and CO₂ geo-sequestration) and the potential for the beneficial phasing/integration of decommissioning activity between operators. This may be achievable within a particular geographic area or specialist type of work, in order to realise any economies of scale that are possible.

6. Post Decommissioning

6.1. Monitoring and Maintenance

Following the completion of decommissioning activities there is a period of observation, monitoring (length of time to be specified on a case-by-case basis) and reporting, through DMIRS to relevant regulatory agencies, to confirm the efficacy of the decommissioning program. Reporting period and frequencies will also be on a case-by-case basis.

Following acceptance by the Minister that all requisite conditions of the monitoring program have been met, the production licence may then be surrendered. If there is more than one field contained under the production licence, then the surrender of such a licence will be dependent on the decommissioning provisions approvals for all petroleum fields under that licence.

6.2. Responsibilities

Registered holders are responsible for the costs and liabilities relating to the removal of property and rehabilitation of the licence area following decommissioning. Post-decommissioning costs in monitoring the efficacy of the decommissioning activities for an agreed period of time are also the registered holders' responsibility. The time period will be determined on a case-by-case basis but would be expected to be in terms of multiple years, with a requirement of annual reporting of observations.

When the ownership of a production licence changes hands, the responsibilities with respect to the forward management of the licence will transfer to the new registered holders, jointly and severally, including all liabilities pertaining to decommissioning obligations.

Change of ownership is conditional on the new registered holder accepting any residual responsibilities and liabilities attached to that licence. Any new registered holder must demonstrate, to the Minister's satisfaction, that it has the technical expertise and financial competency and assurances to comply with the regulatory requirements for managing and decommissioning the fields included in the licences proposed for transfer.

The registered holder is responsible for ensuring that, throughout the entire decommissioning and rehabilitation process, there is an accepted safety system (SC or SMS) in accordance with relevant legislation. The scope of coverage of the safety system includes all activities undertaken by the registered holder/operator and any contractors that are necessary to fulfil the registered holders' obligations and commitments to DMIRS. The safety system is required to be managed, controlled and updated throughout the entire decommissioning and rehabilitation process.

7. Consultation

DMIRS expects registered holders to consult with all relevant stakeholders when planning decommissioning, in accordance with r.17(1)(b) of the Environment Regulations. Registered holders are strongly encouraged to discuss decommissioning programs with the regulator prior to commencing significant research or undertaking landholder or stakeholder negotiations. However, in addition to government, there are many other stakeholders that may have an interest in decommissioning activities and may need to be consulted, such as local government authorities, non-government organisations, fisheries, marine service providers, regional development councils, tourism, other industry, small business owners and the general public.

7.1. Commonwealth of Australia

Commonwealth legislation includes the following Acts with underlying regulations, which may be involved in decommissioning activities:

- *Offshore Petroleum and Greenhouse Gas Storage Act 2006*
- *Environment Protection and Biodiversity Conservation Act 1999*
- *Environment Protection (Sea Dumping) Act 1981*

7.2. International Marine Conventions

The following list, provided for reference, shows the extent of the international regulatory framework and interests:

- United Nations Convention on the Law of the Sea (1982)
- IMO Guidelines and Standards (1989)
- International Convention for the Prevention of Pollution from Ships (MARPOL 73/78)
- 1996 Protocol to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and other Matter, 1972
- The Basal Convention on Control of Transboundary Movements of Hazardous Wastes and their Disposal (1992)

Definitions

ALARP – ‘as low as reasonably practicable’ is used in the regulations to manage risk

Joint Authority (JA) – The Joint Authority of an offshore area of a State is constituted by the responsible State or Territory Minister and the responsible Commonwealth Minister. The term JA may also be used singularly to describe the Commonwealth or State member where those members are undertaking their role in that capacity.

Minister’s delegate – The Minister may, either generally or as otherwise provided by the instrument of delegation, by writing signed by him, delegate to a person any of his powers, functions or duties under the PGERA 67, PSLA 82 or PPA 69, other than this power of delegation. Where, in the exercise of a power which a Commonwealth Act is expressed to confer upon the Designated Authority in respect of the offshore area, the Minister delegates a power to a person who is a public service officer within the meaning of the *Public Sector Management Act 1994* that person may exercise the power.

Onshore area – The area within the limits of a State or Territory including internal waters that is landward of the low tide mark, such as rivers or creeks.

Offshore area – The area extending seaward from the low tide mark on the coastline to the outer limit of the continental shelf.

Territorial sea – The area between the territorial sea baseline and the line that is 12 nautical miles seaward of the territorial sea baseline

Territorial sea baseline – Generally is the line of lowest astronomical tide along the coast, but it also encompasses straight lines across bays (bay closing lines), rivers (river closing lines) and between islands, as well as along heavily indented areas of coastline (straight baselines) under certain circumstances.

