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Abbreviations

In this guideline, the following abbreviations are referred:

ABCi	Authority on Building Control and Construction Industry
ADG	ASCOPE Decommissioning Guidelines
ADH	ASCOPE Decommissioning (Technical) Handbooks
ADH (BD)	ASCOPE Decommissioning Handbook (for Brunei Darussalam)
ASCOPE	ASEAN Council on Petroleum
ASEAN	Association of South East Asian Nations
CA	Comparative Assessment
CO₂	Carbon Dioxide
COMAH	Workplace Safety and Health (Facilities) (Control of Major Accident Hazards) Regulations
COP (COO)	Cessation of Production (or Operation)
DOALOS	Division for Ocean Affairs and the Law of the Sea
DoE	Department of Energy, Prime Minister's Office
DoF	Department of Fisheries, Ministry of Primary Resources and Tourism
D&R	Decommissioning & Restoration
EEZ	Exclusive Economic Zone
EoFL	End of Field Life
EPMA	Environmental Protection & Management Act, Chapter 240
ESHIA	Environmental, Social & Health Impact Assessment
FPF	Floating Production Facility
FPS	Floating Production System
FPSO	Floating Production, Storage and Offtake vessel
FSU	Floating Storage Unit
GHS	Globally Harmonized System of Classification and Labeling of Chemicals
IMO	International Maritime Organisation
JASTRe	Department of Environment, Parks and Recreation, Ministry of Development
LAT	Lowest Astronomical Tide
LSA	Low Specific Activity
m	Metres
MPABD	Maritime and Port Authority of Brunei Darussalam
MSF	Module Support Frame
NORM	Naturally Occurring Radioactive Material
PA	Petroleum Authority of Brunei Darussalam
PCBs	Polychlorinated biphenyls
SBM	Single Buoy Mooring
Review Panel	A body consists of PA, SHENA and other relevant Government agencies
SHENA	Safety, Health and Environmental National Authority
TCP	Town and Country Planning
Te	Metric Tonnes
UN	United Nations
UNCLOS	United Nations Convention on the Law of the Seas
WSHO	Workplace Safety & Health Order
Written Notification	Written Notification of Prescribed Activities (EPMA)

Key Definitions in this Guideline

In this guideline, the following definitions are referred:

<p>Authority</p>	<p>Petroleum Authority of Brunei Darussalam is the appointed authority by the Department of Energy, Prime Minister’s Office to be the focal point for the D&R Submission process and the Authority for Cessation of Production (or Operation) COP (COO) declaration.</p>
<p>Authorities</p>	<p>Authorities means the Review Panel. The Review Panel is made up of a team of various Government agencies of different ministries which has authority on designated subjects or areas and include PA, SHENA, JASTRe, TCP, ABCi, DoF and MPABD.</p>
<p>OTHERs</p>	<p>In this Guideline, use of;</p> <p>‘cessation of production (or operation)’ means the formal and permanent termination of production activities in an oil or gas field or facility due to economic, technical, or regulatory reasons. It marks the point when production is no longer viable and initiates the decommissioning process. This applies to all levels, from individual wells to entire fields;</p> <p>‘conveyance system’ means any apparatus connected to the facility used to transport any material in liquid, gaseous or solid form in bulk between two locations;</p> <p>‘could’ means such practice or method is of an advisory nature. The Duty Holder is not obligated to comply or explain if not in compliance;</p> <p>‘decommissioning’ means the process of taking a facility, well, pipeline or other conveyance system from cessation of production (or operation) of that facility, well, pipeline or other conveyance system to the final declared state of that facility, well, pipeline or other conveyance system, and includes the planning and implementing of any activity required to achieve that final declared state;</p> <p>‘Duty Holder’ as defined in COMAH;</p> <p>‘final declared state’ means an agreement between the duty holder and the competent authority on the expected condition of –</p> <ul style="list-style-type: none"> (a) The facility, well, pipeline or other conveyance system; and (b) The location site <p>at the end of the decommissioning and restoration process, taking into consideration the health, safety and environmental matters and the regulatory requirements;</p>

‘hazardous substance free’ means threshold values for the hazardous substances that is stated by the Duty Holder and based on industry best practice;

‘material change’ (in **COMAH**) means any change in design or operations that is significant to require a re-submission of the notification or Safety Case, and includes –

- (a) Physical changes to the plant;
- (b) Changes to operational parameters;
- (c) Organizational or staff changes; or
- (d) Change in risk profile;

‘material change’ (in **EPMA**) means any change in environmental impact that is significant to require a re-submission of the notification of prescribed activities to the Authority, and includes –

- (a) Physical changes to the premises;
- (b) Changes to operational parameters of the facility;
- (c) Change in risk profile or environmental impact;

‘restoration’ means the actions required to take a location site to its final declared state;

‘shall’ means such practice or method that reflects absolute requirement. In exceptional cases where compliance is not achieved due to technical, operational or HSE reasons, exceptions shall be documented and reported, and all risks mitigated. Please note that this does not release the Duty Holder from the obligation to comply with the Guidelines; and

‘should’ means such practice or method that reflects best operating practice. The Duty Holder is generally expected to comply or come up with an alternative.

Introduction

The Decommissioning and Restoration Guidelines is Volume 11 of The Brunei Oil and Gas Exploration and Production Guidelines. This volume provides guidelines for the oil and gas operators in Brunei Darussalam in the planning, execution and post implementation of the Decommissioning and Restoration (“D&R”) activities.

This Guideline consists of five Chapters covering the following areas:

CHAPTER 1 – Overview of the Decommissioning & Restoration Guidelines

CHAPTER 2 – Decommissioning & Restoration for Onshore Facilities

CHAPTER 3 – Decommissioning & Restoration for Offshore Facilities

CHAPTER 4 – Comparative Assessment Approach for Decommissioning & Restoration

CHAPTER 5 – Well Plug and Abandonment

Objectives of the Decommissioning and Restoration Guidelines

The objective of these Guidelines is to have a consistent approach for all duty holders in the development, submission, review, acceptance and undertaking of D&R activities of onshore and offshore facilities including and not limited to above ground and underground onshore structures, above and below sea level offshore structures, wells, pipelines, jackets, topsides, umbilicals and cables.

These Guidelines are developed and designed to be followed in line with applicable national legislations, directives and government policies in conjunction with regional guidelines, international obligations and standards.

These Guidelines will be used to:

- A. Define the acceptable technical and environmental parameters for D&R of oil and gas wells, facilities & infrastructure in Brunei Darussalam;
- B. Assess whether a particular component of a Concession / Block is to be included within the scope of a D&R Submission;
- C. Complement the process which must be followed for development, submission, review and acceptance of the associated D&R Submission through provision of additional guidance or frameworks;
- D. Align expectations as to what the D&R Submission needs to reflect;
- E. Define the acceptable rationale necessary for the acceptance of the D&R Submission;
- F. Facilitate efficient acceptance of the D&R Submission;
- G. Ensure the requirements of the accepted D&R Submission are fulfilled; and
- H. Close-out all aspects of the D&R Submission to the satisfaction of the Authorities.

Intended Users of this Guideline

The intended users are all entities involved in the development, submission, review, acceptance and undertaking of D&R of oil and gas wells and facilities both onshore and offshore in Brunei Darussalam.

CHAPTER 1 – Overview of the Decommissioning & Restoration

The Government of His Majesty the Sultan and Yang Di-Pertuan of Brunei Darussalam (“the Government of Brunei”), through the Authority is committed to maintaining a clean, healthy and sustainable environment.

Brunei Darussalam has signed up to various international obligations and international treaties. The IMO Guidelines and standards provide that, in general, an abandoned or disused offshore installation or structure on a Continental Shelf or an Exclusive Economic Zone should be removed as soon as reasonably practical once it is no longer serving the prime purpose for which it was originally designated.

Brunei Darussalam has also signed up to the ASEAN Council on Petroleum “ASCOPE Decommissioning Guideline (“**ADG**”) for Oil and Gas Facilities” as of the 5th of November 2012. Based on the ASCOPE Guidelines published in 2012, with the support of relevant industry members, the Government of Brunei has developed this “Brunei Darussalam Decommissioning and Restoration of Onshore and Offshore Facilities” Guideline. The purpose of this Guideline is to set the expectations and framework of the Government of Brunei during the Decommissioning and Restoration (“**D&R**”) processes.

This Guideline provides guidance in preparing submissions for D&R of offshore and onshore structures and part thereof, including wells and pipelines. It provides a framework and is not intended to be prescriptive. It is recognised that circumstances will vary from case to case and that differing approaches may be required. This Guideline covers the process for decommissioning and site restoration of any disused:

- Offshore facility or structure and part thereof, including wells, pipelines jackets and topsides, subsea structures, subsea ancillaries, seabed debris, umbilical and cables;
- Onshore facility or structure and part thereof, including wells, pipelines, workplace and facility locations, pipelines, umbilical and cables (including supporting structures), previously operated/abandoned workplace/facility locations.
- Legacy disposal sites.

This “Brunei Darussalam Decommissioning and Restoration Guideline for Onshore and Offshore Facilities” will supplement the existing D&R related legislations such as the Workplace Safety and Health Order 2009 (WSHO), the Control of Major Accident Hazards Regulations (“**COMAH**”), the Environmental Protection and Management Act, Chapter 240 (“**EPMA**”) (and regulations thereunder) and future associated legislation, which shall be complied by all concerned.

This Guideline is the result of a collaborative effort between the Government of Brunei and relevant Oil and Gas Industry Duty Holders. This collaboration has also included other relevant stakeholders from industry and international consultants. It is the intent to review the Guidelines after three years following the date of issuance, to assess its effectiveness and identify areas, if any, which would require further detailing.

Brunei Darussalam has been an important oil and gas producer for decades and continues to produce significant amounts of oil and gas for the global energy markets. As the oil and gas industry in Brunei Darussalam is maturing, the Authority focusses increasingly on a risk based approach to maximize economic recovery from the oil and gas fields that are approaching their end of field life.

COMAH defines and places a legal duty on the Duty Holder of a Facility, to ensure compliance, to the legislative requirements under the relevant law, including decommissioning and restoration requirements for the facility. In principle, there remains an expectation that all assets, structures and equipment will be removed from the territory of Brunei Darussalam by the relevant operators or Duty Holders and the site returned to its final declared state.

During the life of the hydrocarbon field, Duty Holders may choose to declare 'cessation of production (or operation)' ("**COP(COO)**") for a particular facility / well / pipeline /cluster / group of facility / block / field. An agreement of COP(COO) has to be made as a joint process between the Government of Brunei and that particular Duty Holder. Once this agreement is reached, the process of D&R of that particular asset, shall continue until the final declared state is reached.

All Duty Holders, operators and companies involved in the D&R process are expected to follow the Guideline and be aligned to best industry practices and international standards. The Guideline aims to achieve a constructive balance between the safety and protection of people, property and environment, including societal and cost impacts while minimizing the impact to all neighbours.

The Guideline is based on the use of a Comparative Assessment ("**CA**") of D&R options, by the Duty Holder to inform development of a robust D&R Submission. The Duty Holder is to cover all aspects of the D&R processes as stipulated in this Guideline and provide a close out report to the Authority on completion of the whole process.

This Guideline also highlights the environmental considerations and general technical issues of decommissioning and restoration.

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1. Guidance Coverage

The table below shows a mapping of the ASCOPE Decommissioning Guideline Technical Handbooks to Brunei Legal and Regulatory Framework. Though ASCOPE is focusing on Offshore Oil and Gas Facilities, it can also be used on Onshore Oil and Gas Facilities as applicable.

No.	ASCOPE Technical Handbook	Brunei Legal and Regulatory Consideration
1	Preparation of a Decommissioning Program for ASCOPE Region	COMAH; Guidelines
2	Work Breakdown Structure for use in Platform Decommissioning	COMAH; Guidelines
3	Cost Decommissioning Estimation Methodology	COMAH; Guidelines
4	Technical Methodology Statements	Guidelines
5	Identification, Treating, Storage & Disposal of Waste	EPMA; COMAH; Guidelines
6	Impact Assessment for use in Platform Decommissioning	EPMA; COMAH
7	Consultation Process with key stakeholders	COMAH; Guidelines
8	Preparation of Decommissioning Close Out Report	COMAH; Guidelines
9	Capture of Decommissioning Knowledge and Lessons Learned	Guidelines
10	Converting Offshore Facilities to Artificial Reefs	EPMA; COMAH; Guidelines
11	Life Extension Opportunities	Guidelines
12	Well P & A Planning & Execution	COMAH; Guidelines
13	Post Decommissioning Monitoring	Guidelines
14	Decommissioning of Pipelines	EPMA; Guidelines
15	Decommissioning of Subsea Systems	EPMA; COMAH; Guidelines
16	Decommissioning of Floating Production Systems	EPMA; COMAH; Guidelines

No.	ASCOPE Technical Handbook	Brunei Legal and Regulatory Consideration
17	Preparation of Decommissioning Cost Estimate	COMAH; Guidelines
18	Design of Decommissioning Work Breakdown Structure	COMAH; Guidelines
19	Decommissioning Risk Assessment	COMAH
20	Evaluating Residual Liability Issues in Decommissioning	Guidelines

1.1 Preparation of a Decommissioning Program for ASCOPE Region

Each Duty Holder is expected to prepare a relevant D&R Submission that covers all aspects of the processes, from the COP(COO) of the fixed facility or part thereof, until the final declared state is achieved. This submission will also include any ongoing maintenance and monitoring requirements until a stable state is achieved at the location. This guideline covers the methodology used and Duty Holders should refer to the COMAH Regulations 11A, 16, Schedule 1A and Schedule 5.

Each Duty Holder should have a structured approach to safety management as a field enters its End of Field Life (“EoFL”) phase. This will become part of the submission by the Duty Holder, as part of the D&R Notification and D&R Safety Case under the COMAH Regulations.

A detailed selection process including clear project goals and values for the EoFL should be developed by the Duty Holder in consultation and agreement with the Authority.

1.2 Work Breakdown Structure for use in Platform Decommissioning

Duty Holders are advised to ensure that the methodology they propose for the D&R process, covers all relevant aspects of how the activities will be conducted, including stakeholders involved and that the processes are undertaken within their safety management system. The guidelines will cover the need to have a breakdown of work activities. Duty Holders should also refer to COMAH Regulations 11A, 16, Schedule 1A and Schedule 5.

As part of the decommissioning of facilities, Duty Holders should describe how they will safely deconstruct the facility or part thereof, and the methodology used to monitor what is left behind, to ensure the risk is as low as reasonably practicable

1.3 Cost Decommissioning Estimation Methodology

All Duty holders should provide cost estimation methodology on the D&R activities/project providing clear assumptions, basis and able to demonstrate cost effectiveness through benchmarking.

A D&R Submission should contain an estimate of the cost of the measures proposed, specify the times at or within which those measures are to be taken or make provision for determining those times, and, where an installation or pipeline (offshore) is to remain in position or be only partly removed, include provision for maintenance where necessary.

1.4 Technical Methodology Statements

All Duty Holders are advised to consider the guidance provided in this Guideline. Compliance to legislative requirements is advised when considering the various methodologies. The ASCOPE Guidelines also provide recommendations that may be considered. Duty Holders are reminded to consider best industry practices and be aligned with international standards and methodologies.

Each Duty Holder shall use the technical requirement as described in Section 7 of this Guideline, conduct a comparative assessment of a full range of options and justify the final declared state. The Duty Holders should also describe how they will decontaminate any facility or part thereof including the safe removal of hydrocarbons.

1.5 Identification, Treating, Storage & Disposal of Waste

Under the EPMA and the COMAH Regulations, all Duty Holders should have robust arrangements in place prior to commencement of any D&R activities. For any radioactive material, companies are advised to follow the Radiation Order.

Waste Treatment facilities are to adhere to the legislative requirements under Brunei Law. The Authority reserves the right to verify arrangements in place when considered necessary.

Particular emphasis should be given to the removal of:

- Mercury (and other heavy metals) in sludge
- Polychlorinated biphenyls (PCBs) in oils from capacitors, transformers and other electrical switchgear
- Hydrocarbon liquids / sludge and other hazardous materials
- Lubricating oils from rotating equipment (pumps, compressors etc)
- Asbestos containing materials in insulation, gaskets, packing, partition boards and cement roof sheets
- Pyrophoric iron scale in vessels and pipes, containing iron sulphides prone to spontaneous combustion (important to keep these wet)
- Low Specific Activity (LSA) contamination in scale and sludge, arising from Naturally Occurring Radioactive Material (NORM).

1.6 Impact Assessment for use in Platform Decommissioning

All Duty Holders should manage their activities in compliance to the Laws of Brunei, in particular, under the COMAH Regulations and the EPMA. All Duty Holders should manage their activities in compliance to COMAH Regulations and the EPMA. EPMA stated that it shall be the duty of every person, who intends to carry out the prescribed activity as set out in Schedule 1, to submit a Written Notification to the Authority before he undertakes such prescribed activity. Please refer to Part III General Duty of Person and Prescribed Activities under Section 9 “Written notification for undertaking of prescribed activities”. As such, the respective Duty Holders are expected to assess and/or undertake environmental screening (as applicable) to ensure any impacts on the environment are adequately managed. Records of impact assessments are to be maintained as company records.

1.7 Consultation Process with Key Stakeholders

Under the COMAH Regulations, all Duty Holders shall adequately ensure that all relevant stakeholders, within their organisation and external, are consulted on the impacts of the D&R processes. Duty Holders should refer to the COMAH. Duty Holders should indicate timelines for consultation with external and internal stakeholders and this will be summarized in the D&R Submission and re-emphasized in the D&R Safety Case to be submitted to the Authority.

Early discussions between the Duty Holder and Authority will ensure that the Company takes timely action and that the D&R process is well understood. The Authority will involve other relevant Government agencies as necessary. This includes preparatory work.

Discussions should commence ahead of forecast COP(COO). In the case of a large field with multiple facilities, this may be 2 (two) years or more in advance. The onus rests with the Duty Holder to initiate these discussions.

1.8 Preparation of Decommissioning Close Out Report

All Duty Holders involved in D&R activities where facilities or part thereof are decommissioned and restored shall submit a final Close Out Report of the activities within a year upon completion. Upon receiving, acceptance of the Close Out Report by the Authority will be communicated via email.

The Authority will issue a completion certificate upon acceptance of the D&R activities and receipt of all final close out report for the related facility/ cluster / group of facility / block / field from the Duty Holder. Duty Holders should refer to Regulation 11A, Regulation 16, Schedule 1A and Schedule 5 of COMAH.

The Duty Holder shall implement arrangements for monitoring, maintenance and management of the decommissioned site and any remains of installations or pipelines that may exist. The scope and duration of the monitoring requirements will be agreed between the Duty Holder and Authority in consultation with other Government agencies and details will be included in the D&R Submission. These details should be included in the final close out report that is submitted to the Authority. This final close out report shall

incorporate comments from the Authority and be submitted upon completion of all the D&R activities, to the satisfaction of the Authorities.

In line with the Close Out report (including before, during & after video and/or photos) requirements, it will also be necessary to submit within it, a post-disposal report indicating how the disposal operation was carried out, any immediate consequences of the disposal that have been observed and confirmation that the disposal has been implemented in accordance with the terms of the D&R Submission.

1.9 Capture of Decommissioning Knowledge and Lessons Learned

All Duty Holders involved in D&R activities of their facilities or part thereof should prepare and submit a report on decommissioning experience gained and lessons learned. The Authority would look to utilise this information as industry best practice for the benefit of the country in future D&R activities. The “Learning from Experience” report is to be submitted by the Duty Holder with the close out report, discussed in subsection 1.8 above.

1.10 Converting Offshore Facilities to Artificial Reefs

As supported by the ASCOPE Guidelines, there are various methodologies that may be considered by Duty Holders, when considering options for the D&R process. Offshore structures may be converted; however, they are required to comply with the EPMA and the COMAH Regulations. The Duty Holders should refer to the Regulation 11A, Regulation 16, Schedule 1A and Schedule 5 of COMAH. They are also obliged to consult with relevant government departments and seek the necessary acceptance for this concept selection. Environmental responsibilities are covered under the law and operators are reminded that compliance is mandatory. Industry best practices and international standards should be followed when considering any concept.

The Duty Holder should ascertain the risk posed and the hazard to navigation and his neighbours when considering this option. For any structure left, the Duty Holder will need to make arrangements to ensure that any obstructions to be left in place are suitably marked.

It is the Company’s responsibility to ensure that at least 3 months advance notification of the change in status of decommissioned installations and pipelines is given to the Authority to enable it to inform other Government agencies in particular the Maritime and Port Authority of Brunei Darussalam and Department of Fisheries, Ministry of Primary Resources and Tourism.

In cases where it is agreed that an installation, the 'footings' of a steel installation or a pipeline should remain in place, the Company must ensure that the position (horizontal datum to be stated), surveyed depth and dimensions of the remains and hydrographic are forwarded immediately to the Survey Department for inclusion on admiralty charts.

1.11 Life Extension Opportunities

In line with various concepts that Duty Holders may consider, when engaging with D&R activities for end of field life opportunities, they may consider life extension options as well. Duty Holders are reminded that with regards to all COMAH facilities and parts thereof, good maintenance and fit for purpose standards remain an obligation and the Authority expects all companies to manage this process. Alignment to industry best practices and international standards will provide justification on such concepts when considered and if selected. The guidelines will provide some information on life extension opportunities.

Where it is proposed that an installation and/or structure might be taken out of service and left in situ to undergo D&R at a later date, the Authority should be consulted well in advance of such a step being taken. For example, where a single installation in a multi-installation field becomes redundant and the proposal is that it should be left in place until end of field life, or possibly until a re-use opportunity emerges, it may be appropriate to deal with the situation in this manner. Fit for purpose maintenance of such installation or structure remain a legal obligation.

If it is agreed by the Authority that the D&R process may be delayed until a more appropriate time, the Authority will issue a formal letter setting out the conditions upon which it is prepared to defer until a specified date. The Authority may issue a direction to submit a D&R Submission. Compliance to COMAH Regulations remains mandatory.

1.12 Well P&A Planning & Execution

With due consideration that Brunei has a number of wells that are either in operation or in various stages of their life cycle, the Authority has provided guidelines in terms of Well Plug and Abandonment planning and execution methods. Duty Holders and well operators should adhere to the guidance provided herewith and industry practices should be aligned. Duty Holders must remain in compliance to the COMAH Regulations and other relevant written laws in Brunei.

More details can be found in Chapter 5 of this Guideline.

1.13 Post Decommissioning Monitoring

Post D&R operations, all Duty Holders should ensure that the final declared state achieved for the facility or part thereof, does not undermine nor impact people, property or the environment. The Duty Holder should document and demonstrate the requirements of the post D&R operations monitoring that is to be undertaken based on the Duty Holder's risk assessment to the satisfaction and consideration of the Authority. The duration of such monitoring will be for an agreed term between the Duty Holder and Authority.

For any wells, pipelines and structures decommissioned in situ, depending on environmental sensitivity, will be subject to a suitable monitoring programme agreed with the Authorities. Details should be

specified in the D&R Submission. The form and duration of the monitoring programme will depend upon the prevailing circumstances and, if necessary, be adapted with time. Inspection reports should be submitted to the Authority with proposals for any maintenance or remedial work that may be required.

In addition to debris surveys, a post-D&R environmental seabed or site sampling survey should be undertaken in particular to monitor levels of hydrocarbons, heavy metals and other contaminants in sediment and biota.

In each case, the Company will find it helpful to develop their survey strategy in consultation with the Authority who will take specialist advice from colleagues within other Government agencies. Details of the survey strategy should be included in the D&R Submission. The results of all surveys and a copy of a site or seabed clearance record should be submitted to the Authority.

1.14 Decommissioning of Pipelines

Duty Holders shall notify the Authority on the D&R process from COP(COO) of the pipeline to the final declared state for all pipelines that are considered to be decommissioned.

Onshore, redundant flow-lines and pipelines should be purged and flushed. Flow-lines and pipelines above ground are to be totally removed and the site shall undergo restoration.

Depending on individual circumstances, underground flow-lines and pipelines may be left in situ subject to conditions of the technical requirements and the acceptance of the Authorities. Specific consideration needs to be given to any residual site contamination (e.g. hydrocarbons in soil from past leaks and spills) from all redundant flow lines and pipelines. Visual inspection and soil sampling will generally be required for onshore sites to determine presence of contamination. This may require removal and treatment.

For offshore pipelines, following approach should be used:

- Use the technical requirement, conduct a comparative assessment of all feasible D&R options and justify the final declared state.
- Any removal or partial removal of a pipeline should be performed in such a way as to cause no significant adverse effects upon the marine environment and fishing;
- Any decision that a pipeline may be left in situ should have regard to the likely deterioration of the material involved and its present and possible future effect on the marine environment; and account should be taken of other uses of the sea.
- The Authority may impose further restriction if seen fit when leaving the pipeline line in situ.

1.15 Decommissioning of Subsea Systems

As supported by the ASCOPE Guidelines, Duty Holders are provided with recommendations that may be followed when decommissioning subsea structures and systems. Compliance to COMAH regulations remains an expectation. Duty Holders are obliged to consider industry best practices and international standards when selecting concepts for dealing with the D&R processes for any subsea structures and

systems. The guidelines will provide information on processes that are recommended. Duty Holders should refer to the COMAH Regulations 11A, 16, Schedule 1A and Schedule 5. Duty Holders are reminded to duly consider all relevant written law in Brunei and adhere to all requirements, as stated.

Sub-sea installations include drilling templates, production manifolds, well heads, protective structures, anchor blocks and anchor points, anchor chains, risers and riser bases. Such installations may be completely or partially removed for reuse or recycling, final disposal on land or left in situ subject to final declared state.

1.16 Decommissioning of Floating Production Systems

Currently Brunei does not have any floating production systems other than Single Buoy Mooring (“SBM”) systems. As supported by the ASCOPE Guidelines, Duty Holders are provided with recommendations that may be followed when decommissioning subsea structures and systems. Compliance to COMAH Regulations remains an expectation. Duty Holders are obliged to consider industry best practices and international standards when selecting concepts for dealing with the D&R processes for any floating production systems. The guidelines will provide information on processes that are recommended. Duty Holders should refer to the COMAH Regulations 11A, 16, Schedule 1A and Schedule 5. Duty Holders are reminded to duly consider all relevant written law in Brunei and adhere to all requirements, as stated.

Floating installations will include Floating Production Facilities (“FPFs”) or Floating Production Systems (“FPSs”), Floating Production, Storage and Offtake vessels (“FPSOs”), Floating Storage Units (“FSUs”), and the above mentioned Single Buoy Mooring facilities (“SBMs”). At the end of field life such installations will be floated off location and re-used elsewhere as a production or storage facility. In those cases where re-use does not prove possible, it will be necessary to remove all structures and their accessories, return the facility to shore for storage or dismantling in line with the hierarchy of waste disposal options.

1.17 Preparation of Decommissioning Cost Estimate

All Duty Holders undertaking D&R activities are expected to prepare and be in a position to discuss with the Authority how they have justified cost expenditures relating to the D&R processes they propose to follow. Whilst being in compliance to the requirement of the EPMA and COMAH Regulations, the underlying fact remains that Duty Holders are responsible to follow industry best practices and be aligned with industry standards relevant to the D&R activities being undertaken. The Authority requires for all Duty Holders of COMAH facilities to be in a position to provide cost estimates for the full D&R process and provides actual financial costing as related to, during and post D&R activities for scrutiny by the Authority, and as be required. Duty Holders should also refer to COMAH.

1.18 Design of Decommissioning Work Breakdown Structure

Duty Holders are required to ensure that the methodology they propose for the D&R process, covers all relevant aspects of how the activities will be conducted including design, stakeholder involvement and that the processes are undertaken and managed within their safety management system. The guidelines will cover the need to have a breakdown of work activities. Duty Holders should also refer to COMAH. Planning, implementation and execution processes should be reviewed for providing assurances to the Authority that the D&R processes remain in compliance to the D&R Safety Case Submission.

1.19 Decommissioning Risk Assessment

Prior to commencement of any D&R activities at location, Duty Holders should ensure that robust assessments are prepared considering all the hazards and risks involved with the activities, including the mitigating control measures that are required to manage the operations to as low as reasonably practical. Duty Holders should also refer to COMAH Regulations 11A, 16, Schedule 1A and Schedule 5. They are responsible to follow industry best practices and be aligned with industry standards relevant to the D&R activities being undertaken when considering the hazards associated with D&R. It is recommended that the risk assessments consider all forms of socio-economic and environmental matters pertaining to the location and impacts on neighbours.

1.20 Evaluating Residual Liability Issues in Decommissioning

The D&R processes take into account that the Duty Holder should formally state the final declared state of the site, describing the methodology, and justifying the concept selected for D&R. The final declared state by the Duty Holder must be agreed with the Authority. Failure to achieve the final declared state will result in an agreed conditional agreement between the Authority and the Duty Holder concerned, to provide remedy for the situation and to mitigate any impact to people, property or the environment. Duty Holders are required to evaluate their liabilities from their actions and ensure that this evaluation is discussed and reported to the Authority prior to execution, during and post D&R processes on location, until the completion certificate is issued to the Duty Holder.

In general, if left in situ, residual liability would apply to the Duty Holder up until there is a transfer of ownership, in accordance to terms and conditions as agreed by relevant parties, or final declared state is achieved. This is applicable for structures and part thereof, pipelines and wells.

2. Legal Framework

2.1 National Legislation

The Laws of Brunei Darussalam that are relevant to decommissioning and restoration of onshore and offshore structures and part thereof, wells and pipelines are listed in Chapter Order as follows;

- [1] Chapter 42: The Mining Act (Revised 1984)
- [2] Chapter 44: The Petroleum Mining Act (Revised 1984)
- [3] Chapter 45: The Petroleum (Pipe-Lines) Act (Revised 1963)
- [4] Chapter 138: The Territorial Waters of Brunei Act (Revised 2002)
- [5] Chapter 189: The Land Code (Strata) Act (Revised 2000)

However, the applicable D&R provisions for all relevant Duty Holders awarded by Brunei Darussalam are contained with the Concession/ Blocks / License Holders specific agreements as defined by the Mining Act, (1984) and the Petroleum Mining Act, (1984). As the terms of these specific agreements are highly confidential they are excluded from the scope of this document and the applicable principles for decommissioning and restoration of onshore and offshore structures and part thereof, wells and pipelines as covered in this Guideline.

In addition to the above noted Laws of Brunei Darussalam, there are other additional Statutory instruments and guidelines applicable to D&R and these are listed by category as follows:

Workplace Safety & Health

- [A] Workplace Safety & Health Order, (WSHO), (2009). (as amended)
- [B] Workplace Safety and Health (Control of Major Accident Hazards) Regulations, (COMAH), (2017), (as amended)
- [C] WSHO associated regulations

Environment

- [D] Prevention of Pollution of the Sea Order, (2005).
- [E] Prevention of Pollution Reporting Incidents, Regulations, (2008).
- [F] Prevention of Pollution (Garbage) Regulation, (2008).
- [G] Environmental Protection & Management Order, Chapter 240; (EPMA).
- [H] EPMA associated regulations.

Maritime Security

- [J] Merchant Shipping Order, (2002).
- [K] Merchant Shipping (Safety Convention), (Amendment) Regulation, (2004).
- [L] Merchant Shipping (Safety Zones), (Amendment) Order, (2013).

The legislation and statutory instruments listed above are not exhaustive for all of the D&R activities expected to be undertaken in Brunei Darussalam.

It is expected that early consultation with the Authority, during the process of preparing the D&R Submission will ensure that all Duty Holders utilize the most recent and relevant National Legislation in any decision-making process relating to D&R.

2.2 Regional Obligations

Brunei Darussalam is a Member State of the Association of South East Asian Nations, (“**ASEAN**”) and is also a signatory and contributor to the ASEAN Council on Petroleum (“**ASCOPE**”) Decommissioning Guidelines (“**ADG**”) for Oil & Gas Facilities; further details can be found in the ADG for Oil & Gas Facilities.

In principle, the Authority will follow the ADG and consider other relevant guidelines developed within ASCOPE, where applicable.

2.3 International Obligations

There are four (4) main international obligations that are relevant to D&R of onshore and offshore facilities and structures, including wells and pipelines in Brunei Darussalam;

[1] Brunei Darussalam is a Member State of the International Maritime Organisation (“**IMO**”) and has been since 1984. As such, the Brunei Government is obliged to follow the recommendations set out in ‘The Guidelines and Standards for the removal of offshore installations and structures on the Continental Shelf and in the Exclusive Economic Zone’, (1989).

The IMO Guidelines and standards provide that, in general, an abandoned or disused offshore installation or structure on a Continental Shelf or an Exclusive Economic Zone should be removed as soon as reasonably practical once it is no longer serving the prime purpose for which it was originally designated.

[2] Brunei Darussalam ratified the United Nations Convention on the Law of the Seas (1982) (“**UNCLOS**”) in 1996. This agreement defines the rights and responsibilities of nations in their use of the world’s oceans and seas; establishing Guidelines for maritime business, protection of the marine environment, management of marine natural resources and provision of a mechanism for the settling of maritime related disputes.

[3] Brunei Darussalam ratified the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (1989) in 2002. This agreement regulates the shipment and disposal of hazardous wastes across international borders by the doctrine of prior informed consent between party states.

In order to protect human health and the environment, the Basel Convention requires all practical steps be taken to minimize generation of hazardous wastes and measures be in place to control hazardous wastes storage, transport, treatment, reuse, recycling, recovery and final disposal. Only if a State does not have the capability of managing or disposing the hazardous waste in an environmentally sound manner, should transboundary movement be considered.

[4] Brunei Darussalam ratified the ‘Convention on Biological Diversity’, (1993) in 2008. This agreement supports the conservation of biological diversity and its sustainable use along with the fair and equitable sharing of the benefits arising out of the utilization of genetic resources.

Details of these four main international obligations and how they apply to D&R in Brunei Darussalam are considered in ANNEX TWO, along with a current status of other conventions that Brunei Darussalam is signatory, not detailed in these technical and environmental Guidelines.

It is the intention that these technical and environmental guidelines, will be adopted as approved Code of Practice for D&R processes. The Guideline may be adapted by the Government, as necessary in line with any future changes in national legislation and government policy, aligned with regional guidelines and international obligations.

3. Scope

3.1 Geographical boundaries

This Guideline apply to the territory of Brunei Darussalam; onshore territorial lands and waterways, coastlines and offshore adjacent waters; specified as being between the low water landmark baseline and the seaward limits of the Exclusive Economic Zone (“EEZ”) thereby including internal coastal waters, territorial waters and the contiguous zone.

3.2 Applicability

This Guideline shall apply to onshore and offshore facilities under COMAH purview and associated activities, including and not limited to above and underground onshore structures, above and below sea level offshore structures, wells and pipelines in Brunei Darussalam from the date of issue.

3.3 Major Tasks

The D&R process commences at COP(COO)and involves the decommissioning and potential removal of offshore and onshore facilities or structures and part thereof, and includes depressurization, decontamination of vessels, piping, pipelines and process equipment as well as the clean-up and restoration of sites. The major tasks are not limited to:

- Downhole plug and abandonment of wells.
- Cleaning, purging and isolation of process equipment and piping of fluids and sludge.
- Treatment and/or disposal of process fluids and sludge.
- Removal of wastes and/or chemicals for disposal or re-use.
- Dismantling of wellheads, piping and plant facilities with re-usable items placed in laydown areas.
- Removal and cutting (if necessary for size reduction) of equipment and materials tagged for sale as scrap.
- Removal and cutting or sealing of contaminated equipment, tagged for disposal.
- Removal of transformers, instrumentation and electrical systems for reuse or disposal.
- Removal of structures, pads and foundations not destined for re-use.
- Isolation of underground piping, tanks and structures that are left in place.
- Removal of bridges, drainage culverts, roads and other civil works not needed for future access or erosion control.
- Installation of access controls and/or signposting (notification) for remaining structures. Clean up and restoration of sites.

4. Process

The Duty Holder will be accountable for ensuring that the process leading to the acceptance of a D&R Submission and implementation is effectively followed at all times.

4.1 Cessation of Production (or Operation) COP(COO)

When the Duty Holders are ready to execute the D&R activity, it is the responsibility of the Duty Holder to get consent from the Authority for declaration of COP (COO) within the recommended period as highlighted in the respective chapters.

This is done through a process, which includes formal engagements with the Authority. During these engagements, the Duty Holder shall provide justification and supporting documentation.

The Duty Holder should propose the boundary condition that may consist of a facility/ cluster / group of facility / block / field for discussion with the Authority.

The detailed process is in the respective chapters.

4.2 Stakeholder Engagement Plan, Comparative Assessment & Final Declared State

The Authorities shall review and provide confirmation of final declared state to the Duty Holder. Hence, prior to any D&R submission, the Duty Holder shall submit a stakeholder engagement plan to the Authorities and make the necessary arrangements with the Authorities to present the comparative assessment results as per Chapter 4.

4.3 Submission

Upon receipt of the Consent of COP (COO) from the Authority, the Duty Holder shall submit the D&R Submission as per this Guideline. A D&R Submission may consist of a single or multiple components of onshore and offshore structures and part thereof, wells, piping and pipelines that are included within a Concession / Block. The boundary conditions of the D&R Submission should be agreed by the Authority.

It shall be submitted to the Authority in electronic form along with two (2) hard copies.

For structure and part thereof or/ and pipeline, the D&R Submission consists of;

- D&R Programme as per Annexes in the respective chapters.
- Pipeline Notification (applicable for Pipelines only).
- D&R Notification (assessment matrix as per COMAH Regulations with reference to D&R Submission).
- Written Notification of Prescribed Activity (as per EPMA).
- Other relevant documentation, as advised by the Authority.

For Well Plug and Abandonment (“P&A”) submission, refer to Chapter 5 of this Guideline.

The detailed requirements are in the respective chapters.

4.4 Acceptance

Upon receipt of the D&R Submission of a structure and part thereof or/and pipeline, the review panel that consists of various government agencies will collectively assess the D&R Submission and will respond to the Duty Holder not more than 3 months from the date of submission. The Authority is the focal point for this process.

Should there be any changes to the accepted D&R Submission, the Duty Holder should ensure that the ministerial bodies are kept fully apprised of the proposed date of commencement of D&R activities, so that any potential alterations to the accepted submission can be considered along with their implications in a timely manner. This includes material changes to the D&R Notification under the COMAH Regulations as well as amendments to other notifications and D&R Safety Case.

For P&A submission, refer Chapter 5 of this Guideline.

The detailed acceptance process is in the respective chapters.

4.5 D&R Safety Case Submission (applicable for structure only)

Upon acceptance of the D&R Submission of any structure, the Duty Holder shall submit the D&R Safety Case, prior to commencement of any physical D&R activities, as per the COMAH Regulation to the Authority. If the D&R Safety Case meets the relevant requirements of the COMAH Regulations, the Authority will issue a D&R Safety Case Certificate to the Duty Holder. Based on the receipt of this certificate, the Duty Holder is obliged to commence D&R activities as stipulated in the safety case, and in full compliance to relevant law.

The Authority remains open to dialogue with the Duty Holder at all times during the execution of the D&R Submission under the D&R Safety Case, especially where there is a risk of deviation from the requirements of the accepted D&R Submission, which may result in unexpected challenges arising during the discharge of the Duty Holder's obligations.

In the unlikely event, that such a situation does occur, the Duty Holder shall submit a Material Change to the Authority, and be responsible for undertaking appropriate remedial actions to resolve the issue. Ensuring, that the considered approach provides for a proper regard for the principles of safety of people, property, environment and all associated socio-economic concerns.

4.6 Implementation

The Duty Holder is responsible to implement the D&R activities as per the accepted D&R Submission. The Duty Holder should regularly engage the Authority on the progress of the implementation of D&R Submission as and when required. For the avoidance of doubt, the Authority expects that the Duty Holder should undertake the D&R Submission efficiently, effectively and without delay. If there are any justifiable reasons for deviation, delaying or deferring the D&R activity of the associated onshore or offshore structures and part thereof, including wells and pipelines, the Authority must be informed as early as reasonably practicable with adequate justification warranting the deviation or delay.

4.7 Monitoring, Maintenance & Management

Monitoring, maintenance and management of the decommissioned site and any remains shall be undertaken in line with the scope and duration requirements related to these activities as applicable to each individual Concession / Blocks agreement and in full compliance to relevant written law.

The successful completion of the D&R activities as per accepted D&R Submission should be reported to the Authority in the context of managing concerns arising from implementation of the D&R Submission, with all relevant details captured in the final closeout report.

4.8 Closeout Report

The Duty Holder shall submit the D&R Closeout Report to the Authority within specific duration as specified in the respective chapters after the completion of the D&R activities for any structure and part thereof, well and pipeline. Acceptance of the Closeout Report will be communicated by the Authority via email.

Upon acceptance of all Closeout Reports of the D&R activities of all elements in a facility / cluster / group of facility / block / field, whether structures and part thereof, pipelines and wells, the Authority will issue a D&R Completion Certificate which confirms that the Duty Holder has effectively completed D&R activity as per D&R Safety Case submission.

The Duty Holder should include all D&R knowledge, best practices and lessons learnt during the various phases of the D&R processes. The details can be found in the respective chapters.

5. Industry Cooperation

The Government would like to encourage industry cooperation and collaboration during the D&R of oil and gas wells, facilities & infrastructure in Brunei Darussalam.

This may range from a Government approved general exchange of information where permissible between Duty Holders to a more structured collaboration on specific D&R projects, where the Authority will act as a facilitator.

The Authority also encourages cooperation and collaboration between intra-industry interests in an effort to initiate some innovative and creative thinking around the issues affecting D&R processes on an intra-industrial scale. This however, is based on industry best practices and international standards that may apply to D&R and location specific considerations.

6. General Reporting

6.1 Decommissioning and Restoration Database

Operators are required to submit the data as shown in the tables below including the historical data (since the release of the D&R guideline in 2018) and planned decommissioning and restoration requests and status for the current year. The information shall be submitted by the end of February of each calendar year in spreadsheet format. Wells Data

No.	Well P&A	Asset	Onshore/Offshore	Field	Block	NFUP/COP (COO) Engagement	COP (COO) Declaration Letter (from Operator)		COP (COO) Declaration Letter (from Regulator)		D&R Notification Submission		D&R Notification Approval		Well Programme Submission	
						Date of Engagement	Date of Request	Operator Reference	Date of Approval/Acceptance	Approval/Acceptance Reference	Date of Submission	Submission Reference	Date of Approval/Acceptance	Approval/Acceptance Reference	Date of Submission	Submission Reference

Notice of Well Operation Approval		Written Notification Submission		Written Notification Approval		Actual (Expected) Execution Date/Completion Date	Close-Out Reports Submission		Close-Out Reports Acceptance		Remarks
Date of Approval/Acceptance	Approval/Acceptance Reference	Date of Submission	Submission Reference	Date of Approval/Acceptance	Approval/Acceptance Reference		Date of Submission	Submission Reference	Date of Approval/Acceptance	Approval/Acceptance Reference	

Facilities Data

No.	Facilities (structure/pipeline)	Asset	Field	NFUP/COP (COO) Engagement	COP (COO) Declaration Letter (from Operator)		COP (COO) Declaration Letter (from Regulator)		Comparative Assessment Engagement	Final Declared State		D&R Notification Submission	
				Date of Engagement	Date of Request	Operator Reference	Date of Approval/Acceptance	Approval/Acceptance Reference	Date of Engagement	Date of Approval/Acceptance	Approval/Acceptance Reference	Date of Submission	Submission Reference
D&R Notification Approval		D&R Programme Submission		Written Notification Submission		Written Notification Approval		Actual (Expected) Execution Date/Completion Date	Close-Out Reports Submission		Close-Out Reports Acceptance		Remarks
Date of Approval/Acceptance	Approval/Acceptance Reference	Date of Submission	Submission Reference	Date of Submission	Submission Reference	Date of Approval/Acceptance	Approval/Acceptance Reference		Date of Submission	Submission Reference	Date of Approval/Acceptance	Approval/Acceptance Reference	

7. Technical Requirements for D&R in Brunei Darussalam

7.1 Technical Requirements

This section provides technical requirements for D&R activities in Brunei Darussalam. Having this will provide a consistent approach on D&R solutions. The Duty Holder shall use these technical requirements, conduct a comparative assessment and justify the final declared state. Output will be the final declared state.

The Governments' vision remains that all assets are free of hazardous substances and in principle removed from site when achieving their final declared state as per the COMAH Regulations (Amendment) 2017. It is proposed that all decommissioning and restoration discussions will be between duty holders and Authorities, with an appeals procedure, in line with the present safety and health laws, directed to the Minister, whose decision is final.

The Authority will coordinate this process of review and agreement.

7.2 Onshore Decommissioning and Restoration

In principle, all onshore facilities or part thereof are required to be made hazardous substance free, removed and the site restored.

- Onshore facilities or part thereof above ground are required to be removed.
- Onshore facilities or part thereof below ground to be removed based on final declared state and industry best practice.
- All surface pipelines that have or presently contains hazardous substance are required to be made hazardous substance free, removed and the site restored.
- All subsurface pipelines that have or presently contain hazardous substance are required to be made hazardous substance free and the D&R solution will be assessed on a case by case based on comparative assessment and final declared state.
- The Duty Holder is to engage Authority if subsurface pipelines meet any of the conditions;
 - in the vicinity of residential properties
 - in areas declared for residential or commercial development
 - within eco sensitive areas
 - in the vicinity of schools or hospitals
 - traverse inland waterways, riverine or water masses under water or buried below the water mass
 - cross the international border
- For any assets that are not covered by the above conditions, the Duty Holder is to identify these and then report to the Authority.

7.3 Offshore Decommissioning and Restoration

- Offshore structures and part thereof are required to be made hazardous substance free, removed and the site restored. Structures and part thereof that are beyond 55m water depth will be assessed on a case by case based on comparative assessment and final declared state.
- Duty Holder is to discuss with the Authority if facilities or part thereof are close to the international border or within declared sensitive areas.
- For pipelines coming onshore that in the past have or presently contain hazardous substances are to be made hazardous substance free and removed from the shoreline up to the Lowest Astronomical Tide (“LAT”) or up to 150m from the shoreline whichever is the furthest.
- From the LAT or 150m from the shoreline onwards, all pipelines that in the past have or presently contain hazardous substances are to be made hazardous substance free, case by case basis based on comparative assessment and final declared state.

Annex One: Others

Additional recommendation on legislations and obligations from Authorities, but are not limited to;

- [1] Hazardous Waste (Control of Export, Import and Transit) Order, 2013 (and / or any regulations made thereunder)
- [2] Prevention of Pollution of the Sea (Compoundable Offences) Regulations, 2008
- [3] Land Code, Chapter 40
- [4] Town and County Planning Act, Chapter 248
- [5] ASEAN Working Group on Chemicals and Waste

The working group was established to serve as a consultative platform among ASEAN Member States to further strengthen regional coordination and cooperation in addressing chemicals related issues under relevant multilateral environmental agreements such as Basel Convention, Rotterdam Convention, Stockholm Convention and Minamata Convention, as well as internationally agreed-upon systems such as Globally Harmonized System of Classification and Labeling of Chemicals (“GHS”).

[6] ASEAN Joint Declaration on Hazardous Chemicals and Waste Management 2016, which articulated ASEAN’s concern and commitment to addressing hazardous chemicals and waste management issues in the region

Annex Two: International Obligations

[1] Brunei Darussalam is a Member State of the International Maritime Organisation, (“IMO”) and has been since 1984.

IMO was established in Geneva in 1948 and came into force ten years later as a specialized agency of the United Nations with 169 Member States and three Associate Members.

The primary purpose of IMO is to develop and maintain a comprehensive regulatory framework for shipping and its remit today includes safety, environmental concerns, legal matters, technical co-operation, maritime security and the efficiency of shipping.

IMO guides the regulatory development of member states to improve safety at sea (including safe navigation), facilitate trade and protect the environment.

Early environmental concerns were around oil pollution from tanker operations, machinery space drainage and anti-fouling coatings. These have grown into wider aspects such as energy efficiency and acidification; 23 of the IMO’s 51 legal instruments are environment related.

‘The International Convention for the Prevention of Marine Pollution from Ships’ 1973, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78), entered into force on 2 October 1983 (Annexes I and II) includes regulations aimed at preventing and minimizing pollution from ships.

IMO’s ‘Guidelines & Standards for the Removal of Offshore Installations and Structures on the Continental Shelf and in the Exclusive Economic Zone’ were adopted in 1989. They stem from Article 60 of UNCLOS

1982 and state that abandoned or disused offshore installations or structures on any continental shelf or in any exclusive economic zone are required to be removed, except where non-removal or partial removal is consistent with the stated Guidelines and standards.

The Guidelines also state that the any decisions for non-removal must be made on a case by case basis taking into account at least the following requirements;

- Complete removal of all structures in <75m of water and <4,000 tonnes in air, excluding deck and superstructure;
- Complete removal of all structures emplaced on the sea-bed after 1/1/1998, in less than 100 m of water and weighing < 4,000 tonnes in air, excluding the deck and superstructure;
- Removal should cause no significant adverse effects on navigation or the marine environment;
- Any structure projecting above the surface of the sea should be adequately maintained to prevent structural failure. In cases of partial removal, an unobstructed water column sufficient to ensure safety of navigation, but not less than 55 m, should be provided above any partially removed installation or structure which does not project above the surface of the sea;
- Where living resources can be enhanced by the placement on the sea-bed of material from removed installations or structures (e.g. to create an artificial reef), such material should be located well away from customary traffic lanes, taking into account relevant standards;
- After 1/1/1998, no Installation should be installed unless the design and construction is such that entire removal upon abandonment would be feasible.

[2] Brunei Darussalam ratified the ‘United Nations Convention on the Law of the Seas’ (“UNCLOS”), (1982).

Brunei Darussalam ratified ‘The United Nations Convention on the Law of the Sea’ (UNCLOS) 1982 which defines the rights and responsibilities of nations in their use of the world's oceans, establishing Guidelines for businesses, the environment, and the management of marine natural resources. To date, 158 countries and the European Community have joined in the Convention.

The Convention came into force on 16 November 1994, one year after it received its 60th ratification accession and introduced a number of provisions. The most significant issues covered were setting limits, navigation, archipelagic status and transit regimes, Exclusive

Economic Zones (EEZs), continental shelf jurisdiction, deep seabed mining, the exploitation regime, protection of the marine environment, scientific research, and settlement of disputes. In accordance with article 311 of the Convention, it prevails over the Geneva Convention 1958 by countries which have ratified it.

The UN aims to help States understand and implement the Convention to utilise their marine resources in an environment relatively free of conflict and conducive to development, safeguarding the rule of law in the oceans.

In this context, the Division for Ocean Affairs and the Law of the Sea (“**DOALOS**”) of the United Nations Office of Legal Affairs helps to coordinate the organisation's activities and programmes in the area of marine affairs. It is active in assisting and advising States in the integration of the marine sector in their development planning.

Article 196 requires states to take all measures necessary to prevent, reduce and control pollution of the marine environment from the use of technologies under their jurisdiction.

Article 208 requires coastal states to adopt laws and regulations to prevent, reduce and control pollution of the marine environment arising from or in connection with seabed activities subject to their jurisdiction and from artificial islands, installations and structures under their jurisdiction.

Article 210 requires consultation with other States if they might be affected:

“5. Dumping within the territorial sea and the exclusive economic zone or onto the continental shelf shall not be carried out without the express prior approval of the coastal State, which has the right to permit, regulate and control such dumping after due consideration of the matter with other States which by reason of their geographical situation may be adversely affected thereby”

Wastes derived from the exploration and exploitation of sea-bed mineral resources are, however, excluded from the definition. The provision of the Convention does not apply when it is necessary to secure the safety of human life or of vessels in cases of force majeure.

Annexes list wastes which cannot be dumped and others for which a special dumping permit is required. These include *“4. Vessels and platforms or other man-made structures at sea.”*

The criteria governing the issuing of these permits are laid down in a third Annex which deals with the nature of the waste material, the characteristics of the dumping site and method of disposal. Guidelines are available for the assessment of wastes or other matter that may be considered for dumping and in relation to D&R there are specific Guidelines for assessment of platforms or other man-made structures at sea.

UNCLOS does not explicitly address pipelines. However, international prevailing practice is that pipelines are generally left in place if they are unlikely to cause a hazard.

[3] Brunei Darussalam ratified the ‘Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal’, (1989) in 1996.

Most international waste legislation is aimed at preventing environmental and other hazards from the movement of hazardous wastes, particularly to countries which may be less well equipped with laws or infrastructure to manage those hazards.

During the late 1980s, a tightening of environmental regulations in industrialized countries led to a dramatic rise in the cost of hazardous waste disposal and exports to less developed countries increased.

This international concern led to the drafting and adoption of the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal.

The Convention regulates the international shipment and disposal of hazardous wastes in order to reduce their impact on the environment and consequently ensure the protection of human health. It developed a framework for controlling the transboundary movements of hazardous wastes; that is, the movement of hazardous wastes across international frontiers.

It also established criteria for 'environmentally sound management', thereby ensuring that the export or import of hazardous wastes or other wastes to or from a party or non-party state without a license is prohibited.

Therefore, under the Convention, wastes can only be exported if both the state of import and export have given their consent in writing to the import (effectively being the doctrine of prior informed consent). Information about proposed transboundary movements must be communicated to the States concerned to enable them to evaluate the effects of the proposed movements on health and the environment. Transboundary movements of wastes are only authorised by States where there is no danger attaching to their movement and disposal.

[4] Brunei Darussalam ratified the 'Convention on Biological Diversity', (1993) in 2008.

The Convention states that each State or Contracting Party has, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental policies and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of areas beyond the limits of their national jurisdiction.

The objectives of the Convention, to be pursued in accordance with its relevant provisions, are the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources.

This includes appropriate access to genetic resources and appropriate transfer of relevant technologies, taking into account all rights over those resources and to technologies, and by appropriate funding.

In ratifying the Convention, each State or Contracting Party shall, in accordance with its particular conditions and capabilities, develop national strategies, plans or programmes for the conservation and sustainable use of biological diversity or adapt for this purpose existing strategies, plans or programmes which shall reflect, inter alia, the measures set out in this Convention relevant to the Contracting Party concerned.

Each State or Contracting Party shall also integrate, as far as reasonably practicable and as appropriate, the conservation and sustainable use of biological diversity into relevant sectorial or cross-sectorial plans, programmes and policies.

Chapter 2 – Onshore Decommissioning & Restoration Guidelines

This chapter is more specific for onshore decommissioning and restoration activities of onshore structures and part thereof, and pipelines. This chapter is not applicable for well plug and abandonment processes.

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1. Onshore D&R Submission

The Onshore D&R Submission, will be aligned to the requirements of the COMAH for the D&R Submission, Notifications and D&R Safety Case submission requirements.

The Duty Holder having received consent for the COP (COO) from the Authority, will be in line with the COMAH requirements submit a D&R Notification. The Onshore D&R Submission should follow the model template set out in this document, in line with the description of the summary descriptions to be provided under each section heading. Prior to commencement of physical activities onsite for decommissioning of any onshore structure and part thereof, the Duty Holder shall submit a D&R Safety Case to the Authority.

The expectation however remains, that the content provided under each section heading in the Onshore D&R Submission is sufficiently detailed such as to demonstrate that a viable strategy & associated cost estimate has been suitably developed by the Duty Holder to enable the Authority to make the requisite decisions on whether the D&R Submission, Notifications and the D&R Safety Cases are acceptable for the assets concerned.

The Onshore D&R Submission Template provided for completion by the Duty Holder in Annex Three is fit for purpose for use across all Brunei Darussalam Onshore D&R activities and fully satisfies the legal requirements for adequately describing how Onshore D&R is to be conducted. Offshore D&R activities are captured under Chapter 3.

However, where a D&R Submission comprises of both offshore and onshore assets, (or asset components), the Duty Holder may propose to combine discrete elements of the Onshore and Offshore D&R Submission Templates into one D&R Submission in order to assist the review, consultation and acceptance process.

The scope of the combined Onshore and Offshore D&R submission should be discussed and agreed between the Authority and Duty Holder prior to submission, to ensure that the approach is appropriate. For an asset, (or asset component), which is located both offshore and onshore, such as some pipelines, the interface point between offshore and onshore should be clearly defined in the D&R submission.

The contents of the “Onshore D&R Submission” Template are summarised below:

1.1 D&R Programme as per Annex Three

The contents of the Onshore D&R Programme shall include the following;

- Executive Summary
- Components of the Proposed Onshore D&R Activities
- Proposed Onshore D&R Methodology
- Environmental Management
- Stakeholder Consultations
- Onshore D&R Notification Management

- Key Supporting Documents
- Venture Participants Letters of Consent
- Key Relevant Documents

1.2 Pipeline Notification

Duty Holders shall notify the Authority for all pipelines that are intended to be decommissioned.

1.3 D&R Notification (assessment matrix as per COMAH Regulations with reference to D&R Submission)

With due reference to COMAH; the Duty Holder shall follow the regulatory details provided under Schedule 1A. Ensuring that the content of the D&R Submission captures all aspects required to be complied with under the legislation.

1.4 Written Notification of Prescribed Activity

The Duty Holder shall conduct or arrange for environmental impact assessment when involving activities related to hazardous substances;

Environmental impact assessment shall be conducted when involving activities related to hazardous substances;

- Construction, refurbishment and decommissioning of pipelines and onshore workplaces and facilities.
- Processing, transporting, handling, storing and disposal.

A Written Notification of Prescribed Activity as required in reference to Section 9 of EPMA shall be submitted to the Authority. Duty Holder shall provide the approved Written Notification of Prescribed Activity as part of its D&R Submission.

1.5 Other relevant documentation, as advised by the Authority

The Authority confirm that there is an expectation for the Duty Holder to provide information in diagrams, figures and / or tables and provide appropriate summary information in each section.

2. D&R Submission Process & Timeline

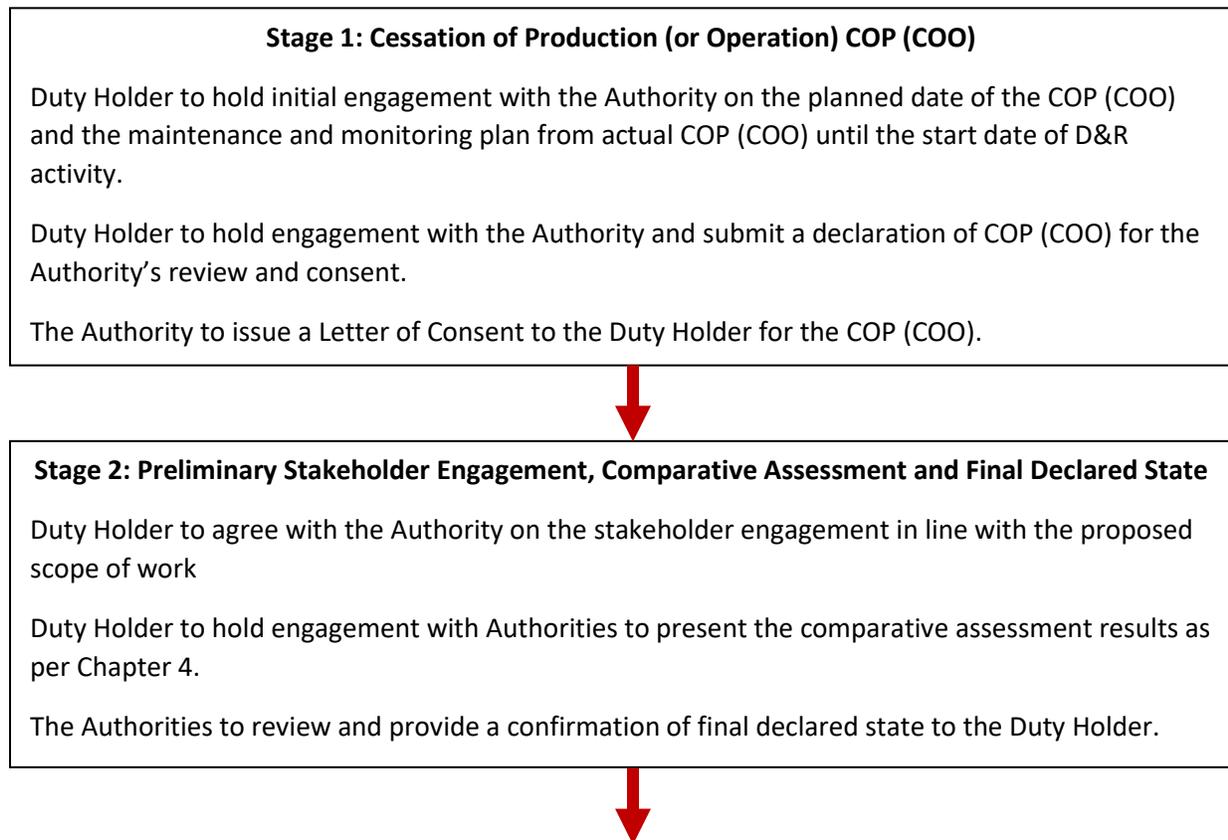
For onshore decommissioning and restoration activities, there are total of 5 submissions to be submitted to the authority bodies throughout the D&R cycle.

- i. COP (COO) declaration for the Authority consent
- ii. Comparative Assessment and Final Declared State
- iii. D&R Submission to the Authority
- iv. D&R Safety Case submission for issuance of D&R Safety Case Certificate by the Authority (applicable for structure only)
- v. Close-out Report to the Authority

Details of the process, expectations and timeline are set out below.

The following flowchart indicates the key stages required for Onshore D&R Submission.

2.1 D&R Submission Process Flowchart



Stage 3: D&R Submission

Duty Holder to formally submit the D&R Submission to the Authority.
The Authorities to review and provide a confirmation to the Duty holder.



Stage 4: Submission of D&R Safety Case (applicable for structure only)

Prior to commencement of any physical D&R activities onsite, the Duty Holder is to submit a D&R Safety Case to the Authority.
The Authority will review the D&R Safety Case. If it meets the relevant requirements of the COMAH Regulations (Amendment) 2017, then the Authority will issue a D&R Safety Case Certificate to the Duty Holder.



Stage 5

Submission of D&R Close-out report

Upon completion of physical D&R activities onsite, the Duty Holder shall submit a D&R close-out report to the Authority. The Authority will issue a D&R completion certificate upon acceptance of the all Closeout Reports of a facility and part thereof / cluster / group of facility and part thereof / block / field.

General Notes on the D&R Submission Process

Other relevant requirements may apply and the Duty Holder may incorporate these into the process as necessary.

Procedural Notes on undertaking the D&R Submission Acceptance Process

Completion of the key activities required to fulfil Stages 1 to 5 are summarised as follows:

Stage 1

Under Stage 1 of the D&R Submission Process, the Duty Holder shall hold an initial engagement with the Authority on the planned date of COP (COO) and the maintenance and monitoring plan from actual COP (COO) until the start date of D&R activity.

When the Duty Holders are ready to execute the D&R activity, it is the responsibility of the Duty Holder to get a consent from the Authority for declaration of COP (COO). This is done through a process, which

includes engagements with the Authority. During these engagements, the Duty Holder shall provide justification and supporting documentation.

It is recommended that the Duty Holder to follow the timeframe as highlighted in the diagrams below. This is to ensure that both the Duty Holder and Authorities have sufficient time to follow the process.

Stage 2

Prior to any D&R submission, Duty Holder to submit their stakeholder engagement plan and organize engagement(s) with the Authorities to present the comparative assessment results as per chapter 4, in order for the Authorities to review and provide a confirmation of final declared state to the Duty holder.

Stage 3

In this stage, the Duty Holder shall submit a D&R Submission in electronic form and two hard copies to the relevant Authority for review and acceptance (Petroleum Authority to be electronically carbon copied). The outline for the D&R Programme can be found in Annex Three of this Guideline.

Upon receipt of the D&R Submission, the relevant Authority will assess the D&R Submission and will provide written response to the Duty Holder not more than 3 months from the date of receipt of the complete D&R Submission.

Where there is any Material Change to the acceptance of D&R Submission, the Duty Holder should amend the D&R Submission accordingly and resubmit for assessment.

Stage 4 (Applicable for Structure only)

Upon acceptance of the D&R Submission, the Duty Holder shall submit the D&R Safety Case, prior to commencement of any physical D&R activities, as per the COMAH Regulation (Amendment) 2017 to the Authority. If the D&R Safety Case meets the relevant requirements of the COMAH Regulations, the Authority will issue a D&R Safety Case Certificate to the Duty Holder. Based on the receipt of this certificate, the Duty Holder is obliged to commence D&R activities as stipulated in the safety case, and in full compliance to relevant law.

Stage 5

The Duty Holder shall submit the D&R Close Out Report to the Authority within 12 months after the completion of the D&R program.

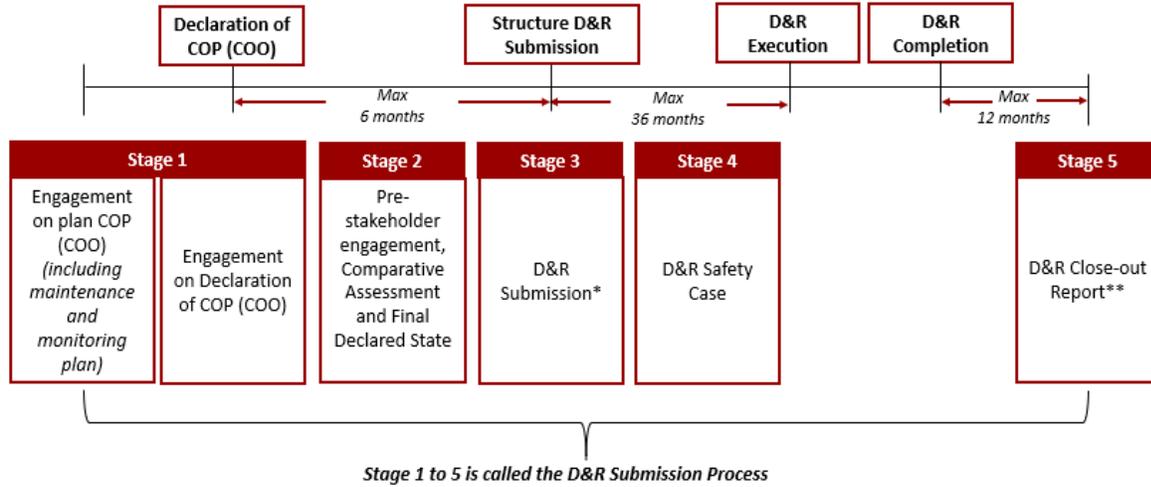
The close-out report should include the following, but not limited to;

- Actual D&R and waste disposal strategy vs. plan
- Actual site restoration including photos vs. plan
- Any deviations with justification to the D&R, waste disposal and site restoration strategies
- Result and outcome of the baseline monitoring including remedial actions if applicable

- Post-D&R maintenance and monitoring plan
- Safety and environmental performance
- Actual cost and schedule vs. plan
- Lessons learnt and recommendation during the various phases of the D&R process

Acceptance of any closeout reports will be communicated by the Authority via email.

Overview of the Process & Timeline for Decommissioning Onshore Structure



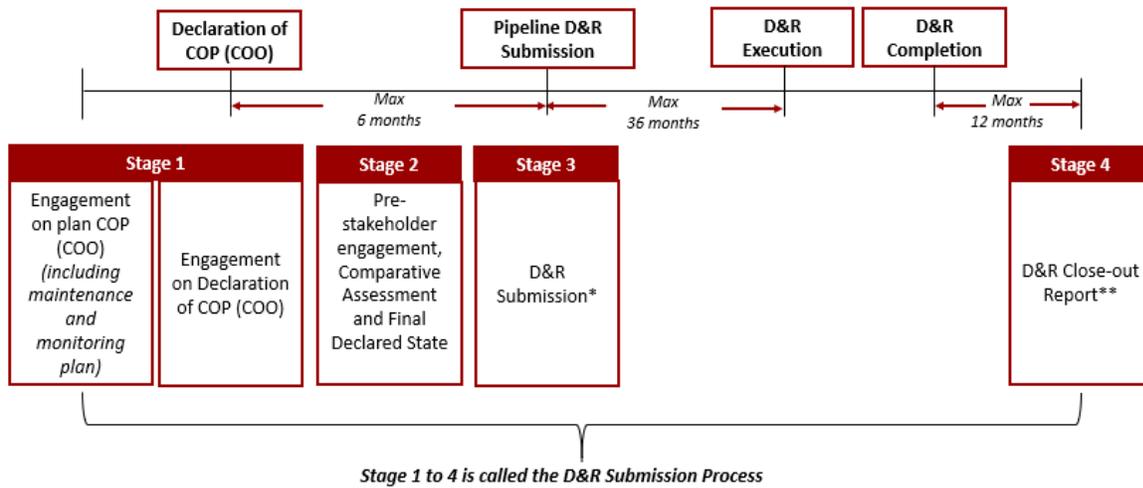
* Assessment by Authorities - Response to Duty Holder at a minimum of 3 months from the date of receipt complete submission

** Acceptance via email on the individual close-out report and issued of D&R completion certificate

Deliverables by Duty Holder

- *D&R Submissions includes:
- D&R Programme
 - D&R Notification (COMAH)
 - Written Notification (EPMA)
 - Pipeline Notification (draft)

Overview of the Process & Timeline for Decommissioning Onshore Pipeline



* Assessment by Authorities - Response to Duty Holder at a minimum of 3 months from the date of receipt complete submission

** Acceptance via email

Deliverables by Duty Holder

- *D&R Submissions includes:
- D&R Programme
 - D&R Notification (COMAH)
 - Written Notification (EPMA)
 - Pipeline Notification (draft)

3. D&R Completion Certificate

The Duty Holder is obligated to follow the agreed minimum requirements of the D&R close-out report and to keep records of submission and authority acceptance of closed out reports of all the components of a facility and part thereof / cluster / group of facility and part thereof / block / field.

When this is verified, the Authority will issue a formal D&R Completion Certificate which confirms, that the Duty Holder has effectively completed D&R activities for all elements of a facility and part thereof / cluster / group of facility and part thereof / block / field, whether they are structures and part thereof, pipelines and / or wells as per the D&R Safety Case submissions and acceptance of all the close-out reports. The issuance of D&R completion certificate to the Duty Holder may be issued with conditions including residual liability, if the final agreed declared state is not achieved.

Annex Three: Onshore D&R Programme Template

Note: *The Duty Holder should follow the guidance and the examples provided in italics before deleting same and preparing their particular Concession / Block specific Onshore D&R Submission. This submission guidelines are required to conform to the requirements of the COMAH Regulations and other relevant written laws in Brunei.*

**'CONCESSION / BLOCK NAME'
ONSHORE
DECOMMISSIONING & RESTORATION
(D&R)
PROGRAMME**

Document Revision Control

Insert contents into the table of document revisions.

Revision	Date	Description

Distribution List

Insert contents into the table of document revisions.

Revision	Date	Description

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Abbreviations & Acronyms Used in this Document

Include a table of the Abbreviations used in this document.

Abbreviation	Explanation

Terms Used in this Document

Include a table of the Terms used in this document.

Term	Explanation

Figures

Include a list of Figures used in this document.

Figure	Description

Tables

Include a list of Tables used in this document.

Table	Description

Appendices

Include a table of the appendices included in this document.

Appendix	Description

1. Executive Summary

The Duty Holder should provide summary of the proposed onshore D&R activities for all related facility components of the Concession / Block, in order to provide a suitable overview of the Onshore D&R Submission.

The summary should include the followings:

- Geographical location map
- Workplace / Facility map and locations (include nearby workplace / facility)
- Onshore structures / facilities and part thereof
- Onshore wells
- Onshore Pipelines, Umbilicals & Cables (including supporting structures)
- Waste management strategy
- Project timeline and cost estimate
- Status of COP (COO) consent
- Final D&R concept

2. Components of The Proposed Onshore D&R Activities

2.1 Onshore Structures/Facilities and part thereof

The Duty Holder should complete Table 2.1 for all of the applicable onshore structures / facilities and part thereof associated with the proposed onshore D&R activities as far as is reasonably practicable, or indicate NA as applicable.

Table 2.1: Workplace / Facility Locations D&R Information				
Name	Location	Type	Area (m2) / Dimensions (m x m)	Total Weight (Te)
<i>e.g. Gadong Gas Metering Station</i>	<i>57° 08'37" N 2° 05'53" W</i>	<i>Metering</i>	<i>10,000 / 100 x 100</i>	<i>80</i>
<i>e.g. Berakas Filling Station</i>		<i>Underground Storage Tanks</i>		

2.2 Onshore Wells

The Duty Holder should complete Table 2.2 for all of the applicable onshore wells P&A associated with the proposed onshore D&R activities as far as is reasonably practicable, or indicate NA as applicable.

Table 2.2: Onshore Wells P&A Information			
Field / Well Name	Well Type	Well Status	Well COP (COO) approval status
<i>e.g. Field / Well name</i>	<i>Oil / Gas / Water Injection</i>	<i>Producing / Close-In / Suspended</i>	<i>Approval reference and date.</i>

2.3 Onshore Pipelines, Umbilicals & Cables (including supporting structures)

The Duty Holder should complete Table 2.3 for all of the applicable onshore pipelines, umbilicals & cables (including supporting structures) associated with the proposed onshore D&R activities as far as is reasonably practicable, or indicate NA as applicable.

Table 2.3: Onshore Pipelines, Umbilicals & Cables (including supporting structures) D&R Information									
Name or number	Description	Diameter (mm)	Length (km)	Component Material	Product Medium	From / To	Burial Status	Operational Status	Comments
e.g. PL-289 (Pipeline)	Main Export Line	500	18	Concrete coated steel	Oil	WHP-289 / WH-289	Trenched & buried	Operational	Operated with 3 rd party crossing. X no. of bridge crossing
e.g. U-289 (Umbilical)	Control to WH-289	100	18	Composite flexible	NA	WHP-289 / WH-289	Surface laid	Operational	Bio-degradable

2.4 Previously Operated / Abandoned Workplace / Facility Locations

The Duty Holder should complete Table 2.4 for all of the applicable previously operated / abandoned workplace / facility locations associated with the proposed onshore D&R activities as far as is reasonably practicable, or indicate NA as applicable.

Table 2.4: Previously Operated / Abandoned Workplace / Facility Locations				
Name / Type of waste disposal	Quantity	Weight (Te) and / or Dimensions (m)	Location	Comments / Status (lined/unlined, controls in place, likely categorization of waste)
<i>e.g. Gadong Waste Pit</i>	<i>16</i>	<i>Weight: 400 / Dims. 6 x 3 x 3</i>	<i>57° 08'37" N 2° 05'53" W</i>	<i>Unlined. Covered with 0.3 m topsoil. No monitoring of soil or water. Content of pits may be hazardous.</i>

3. Onshore D&R Methodology

During preparation of the contents of Sections 3.1 through 3.5 by the Duty Holder; due cognizance should be taken of the importance of safety, the environment, socio-economic and other impacts of the onshore D&R activities on Brunei Darussalam Society in order to achieve an effective balance during the Onshore D&R Submission implementation.

For onshore structures and pipelines, the general approach is to use the baseline, conduct a Comparative Assessment (CA) and justify the final declared state. Comparative assessment can be done on a case-by-case or grouped basis and following industry best practices and international standards.

The D&R solutions from previous D&R Submission may be re-used for a new Onshore D&R scope of work, if the Authorities agree that this approach is reasonable under the circumstances. Where applicable, environmental and social baseline surveys and / or conceptual site modelling are to be conducted for onshore assets subject to D&R in order to act as a reference point for the impact of onshore D&R activities and to inform potential remediation activities. Previous existing baseline survey data can be used where applicable and valid.

3.1 Onshore Wells

Refer Chapter 5 of this Guideline on Well Plug and Abandonment (P&A).

3.2 Workplace Facilities/Locations

The Duty Holder should adequately describe the proposed scope of work for undertaking workplace facilities / locations D&R activities using concise text, indicating which equipment and resources should be applied along with any anticipated risks, challenges or interests during the proposed onshore D&R activities.

For disposal activities, where applicable, the Duty Holder should adequately describe the proposed scope of work for the safe and responsible disposal of the workplace facilities using concise text, indicating waste type, waste composition, disposal route and any risks or issues regarding the potential for trans-frontier shipment of waste or any other anticipated challenges or interests during the proposed disposal activities. Baseline surveys and / or conceptual site modelling should be referenced as applicable

For restoration, where applicable and using concise text, the Duty Holder should adequately describe the proposed scope of restoration work e.g. Undertake remediation of any soils, water and subsequent validation & monitoring at the workplace / facility location sites. Also carry out any required re-vegetation, site contouring and re-establishment of site drainage and erosion control.

3.3 Onshore Pipelines, Umbilicals & Cables

The Duty Holder should adequately describe the proposed scope of work for undertaking pipelines, umbilical & cables D&R activities using concise text. Indicating equipment and resources which should be applied along with any anticipated challenges and interests during the proposed D&R activities.

For disposal activity, where applicable, the Duty Holder should adequately describe the proposed scope of work for the safe and responsible disposal of each pipeline, umbilical & cable using concise text. The Duty Holder should indicate waste type, waste composition, disposal route and risks and / or any issues regarding the potential for trans-frontier shipment of waste or any other anticipated challenges or interests during the proposed disposal activities.

For restoration, where applicable and using concise text, the Duty Holder should adequately describe the proposed scope of restoration work e.g. Undertake remediation of any soils, water and subsequent validation & monitoring along the pipeline, umbilical and cable routes.

Also carry out any required re-vegetation, site contouring and re-establishment of site drainage and erosion control.

3.4 Previously Operated/Abandoned Workplace Facilities Locations

The Duty Holder should provide a concise description of the proposed D&R methodology for previously operated / abandoned workplace facilities / locations. Where previously operated / abandoned workplace facilities / locations are not included as part of the proposed D&R activities, the Duty Holder should indicate NA as applicable.

The Duty Holder should adequately describe the proposed scope of work for undertaking previously operated / abandoned workplace facilities / locations D&R activities using concise text, indicating which equipment and resources should be applied along with any anticipated challenges or interests during the proposed D&R activities.

Where applicable, the Duty Holder should adequately describe the proposed scope of work for the safe and responsible disposal of each previously operated / abandoned workplace facilities / location using concise text, indicating any issues regarding the potential for trans-frontier shipment of waste or any other anticipated challenges or interests during the proposed disposal activities if applicable. Baseline surveys and / or conceptual site modelling should be referenced.

Where applicable and using concise text, the Duty Holder should adequately describe the proposed scope of restoration work e.g. Undertake remediation of any soils, water and subsequent validation & monitoring along the pipeline, umbilical and cable routes.

Also carry out any required re-vegetation, site contouring and re-establishment of site drainage and erosion control.

3.5 Waste Streams

This section should describe the extent, if any, to which the oil and gas facilities and infrastructure should be re-used, recycled, recovered or disposed of in line with applicable regulations. In this regard, the Duty Holder should complete Table 3.5 below and thereby provide a concise description of how the waste streams arising from the proposed D&R activities should be managed, including any potential issues regarding the trans-frontier shipment of waste (hazardous and non-hazardous) or any other anticipated challenges or interests related to the Onshore D&R Submission. The description should include selection of appropriate methods for remediation of contaminated soil and water to minimize waste production.

Waste Management Hierarchy shall be applied when managing waste generated from the proposed D&R activities, which places waste prevention/reduction as the preferred option, followed by reuse and then recycle, and disposal as the last option.

Table 3.5: Waste Stream Management	
Waste Stream	Strategy
<i>List the type (e.g. asbestos, mercury etc.) and amount of waste</i>	<i>Describe how and where the waste will be disposed</i>

4. Environmental Management

4.1 Environmental Features & Sensitivities

Where applicable, the Duty Holder should follow an industry standard risk assessment process and draw on the conclusions in the specific Environmental, Social & Health Impact Assessment process, (ESHIA process) for the onshore D&R activities as referenced in Key Supporting Documents and include as appendices, the impact assessment sections. This should, where applicable, include environmental baseline surveys and / or conceptual site modelling to act as a reference point for the impact of the onshore D&R activities. Duty Holders are required to ensure assessments are aligned to the legislative requirements of applicable Brunei law, in particular the EPMA and any regulations made thereunder.

In accordance with the industry standard process, previous baseline data and the results of previous impact assessments may be used where applicable and valid. Where there are no environmental features & sensitivities associated with the proposed onshore D&R activities, the Duty Holder should indicate NA as applicable, with summary justifications.

4.2 Potential Environmental Impacts & Mitigation

The Duty Holder should provide a concise description of the main potential environmental impacts arising as a result of undertaking the proposed onshore D&R activities for each component item, along with a description of the proposed mitigation for same after completion of the ESHIA process, where applicable.

The Duty Holder should draw a summary on the conclusions of ESHIA process undertaken, where applicable, for the Onshore D&R Submission as referenced in Key Supporting Documents and included as

appendices, the mitigation control section. Where there are no potential significant environmental impacts associated with the proposed onshore D&R activities, the Duty Holder should indicate NA as applicable, with summary justifications.

5. Stakeholder Consultations

As per this Guideline, the Duty Holder is required to submit a preliminary Stakeholder Engagement Strategy to the Authority for consultation. The preliminary stakeholder Engagement Strategy will include a concise list of Stakeholders, who are directly affected by the proposed onshore D&R activities, a summary of the Duty Holder's engagement with the Stakeholders and provide mitigation measures for any impacts registered.

In this section, the Duty Holder should provide a summary of the final stakeholder engagement strategy to the Authority and provide outcomes from the stakeholder engagements strategy as well.

6. D&R Safety Case

This section would not be applicable in the initial D&R Submission to the Authority. However, prior to commencement of any D&R physical activities onsite, the Duty Holder shall submit the D&R Safety Case to the Authority, as per the COMAH Regulations (Amendment) 2017, providing detailed information as reflected in Schedule 5.

This submission of the D&R Safety Case is only applicable for decommissioning of onshore structures. This is not required for decommissioning of onshore wells and pipelines.

7. Management of Onshore D&R Activities

7.1 Project Management

The Duty Holder should summarize the project management strategy including Contract and Procurement (C&P) in the undertaking of the proposed onshore D&R activities using concise text and diagrams.

7.2 Project Schedule

The Duty Holder should provide a Level 1 type schedule of the onshore D&R activities, along with key dates and defined milestones.

The Duty Holder should implement the D&R activities in an efficient and effective manner.

However, the Authority may consider a flexible approach to onshore D&R scheduling where the potential for increased efficiencies leading to cost savings can be demonstrated by the Duty Holder at any time during execution of the Onshore D&R activities.

7.3 Cost Estimate

The Duty Holder should provide a provisional cost estimate in 'Money of the Day' for undertaking the Onshore D&R Submission by component as applicable. Where a cost estimate is deemed as not required against a particular component of the proposed onshore D&R activities, the Duty Holder should indicate NA as applicable.

It is recognised that accuracy of D&R cost estimating has historically been unpredictable, due to complexities and uncertainties in the nature of D&R and that as a result, costs may be subject to change.

7.4 Monitoring, Maintenance & Management

Where applicable the Duty Holder should summarize the strategy for implementation of a post-D&R monitoring, maintenance and management programme associated with the Onshore D&R Submission using concise text.

8. Key Supporting Documents

The Duty Holder should list all applicable key supporting documents referenced in the Onshore D&R Submission.

Supporting documents may include document name and extract of the following, as applicable:

- Technical Studies
- Safety Studies
- Environmental, Social & Health Impact Assessment (ESHIA) Studies
- Comparative Assessment
- Other Relevant Studies

However, the Authority may request the full report, if required.

9. Venture Participant Letters of Consent

Where the Duty Holder comprises of more than one venture party then the Operator or Duty Holder of the Facility / Concession / Block assigned by the Authority should obtain authenticated letters of consent for undertaking the Onshore D&R Submission from the other venture participants.

Appendices

Duty Holder should list the appendices as referenced in this document.

Chapter 3 – Offshore Decommissioning & Restoration Guidelines

This chapter is more specific for offshore decommissioning and restoration activities of offshore structures and part thereof, and pipelines. This chapter is not applicable for well plug and abandonment processes.

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The Duty Holder having received consent for the COP (COO) from the Authority, will be in line with the COMAH requirements submit a D&R Notification. The Offshore D&R Submission should follow the model template set out in this document, in line with the description of the summary descriptions to be provided under each section heading. Prior to commencement of physical activities onsite for decommissioning of any offshore structure and part thereof, the Duty Holder shall submit a D&R Safety Case to the Authority.

The expectation however remains, that the content provided under each section heading in the Offshore D&R Submission shall be sufficiently detailed such as to demonstrate that a viable strategy & associated cost estimate has been suitably developed by the Duty Holder to enable the Authority to make the requisite decisions on whether the D&R Submission, Notifications and the D&R Safety Case are acceptable for the assets concerned.

The Offshore D&R Submission Template provided for completion by the Duty Holder in Annex Four is fit for purpose for use across all Brunei Darussalam Offshore D&R activities and fully satisfies the legal requirements for adequately describing how Offshore D&R is to be conducted. Onshore D&R activities are captured under Chapter 2.

However, where a D&R Submission comprises of both onshore and offshore assets, (or asset components), the Duty Holder may propose to combine discrete elements of the Onshore and Offshore D&R Submission Templates into one D&R submission in order to assist the review, consultation and acceptance process.

The scope of the combined Onshore and Offshore D&R Submission should be discussed and agreed between the Authority and the Duty Holder prior to submission, to ensure that the approach is appropriate. For an asset, (or asset component), which is located both offshore and onshore, such as some pipelines, the interface point between offshore and onshore should be clearly defined in the D&R Submission.

The contents of the “Offshore D&R Submission” Template are summarised below:

1.1 D&R Programme as per Annex Four

The contents of the Offshore D&R Programme shall include the following;

- Executive Summary
- Components of the Proposed Offshore D&R Activities
- Proposed Offshore D&R Methodology
- Environmental Management
- Stakeholder Consultations
- Offshore D&R Notification Management
- Key Supporting Documents

- Venture Participants Letters of Consent
- Key Relevant Documents

1.2 Pipeline Notification

Duty Holders shall notify the Authority for all pipelines that are intended to be decommissioned.

1.3 D&R Notification (assessment matrix as per COMAH Regulations with reference to D&R Submission)

With due reference to COMAH; the Duty Holder is required to follow the regulatory details provided under Schedule 1A. Ensuring that the content of the D&R Submission captures all aspects required to be complied with under the legislation.

1.4 Written Notification of Prescribed Activity

The Duty Holder shall conduct or arrange for environmental impact assessment when involving activities related to hazardous substances;

Environmental impact assessment shall be conducted when involving activities related to hazardous substances;

- Construction, refurbishment and decommissioning of pipelines and offshore workplaces and facilities.
- Processing, transporting, handling, storing and disposal.

A Written Notification of Prescribed Activity as required in reference to Section 9 of EPMA shall be submitted to the Authority. Duty Holder shall provide the approved Written Notification of Prescribed Activity as part of its D&R Submission.

1.5 Other relevant documentation, as advised by the Authority

The Authority confirm that there is an expectation for the Duty Holder to provide information in diagrams, figures and / or tables and provide appropriate summary information in each section.

2. D&R Submission Process & Timeline

For offshore decommissioning and restoration activities, there are total of 5 submissions to be submitted to the authority bodies throughout the D&R cycle.

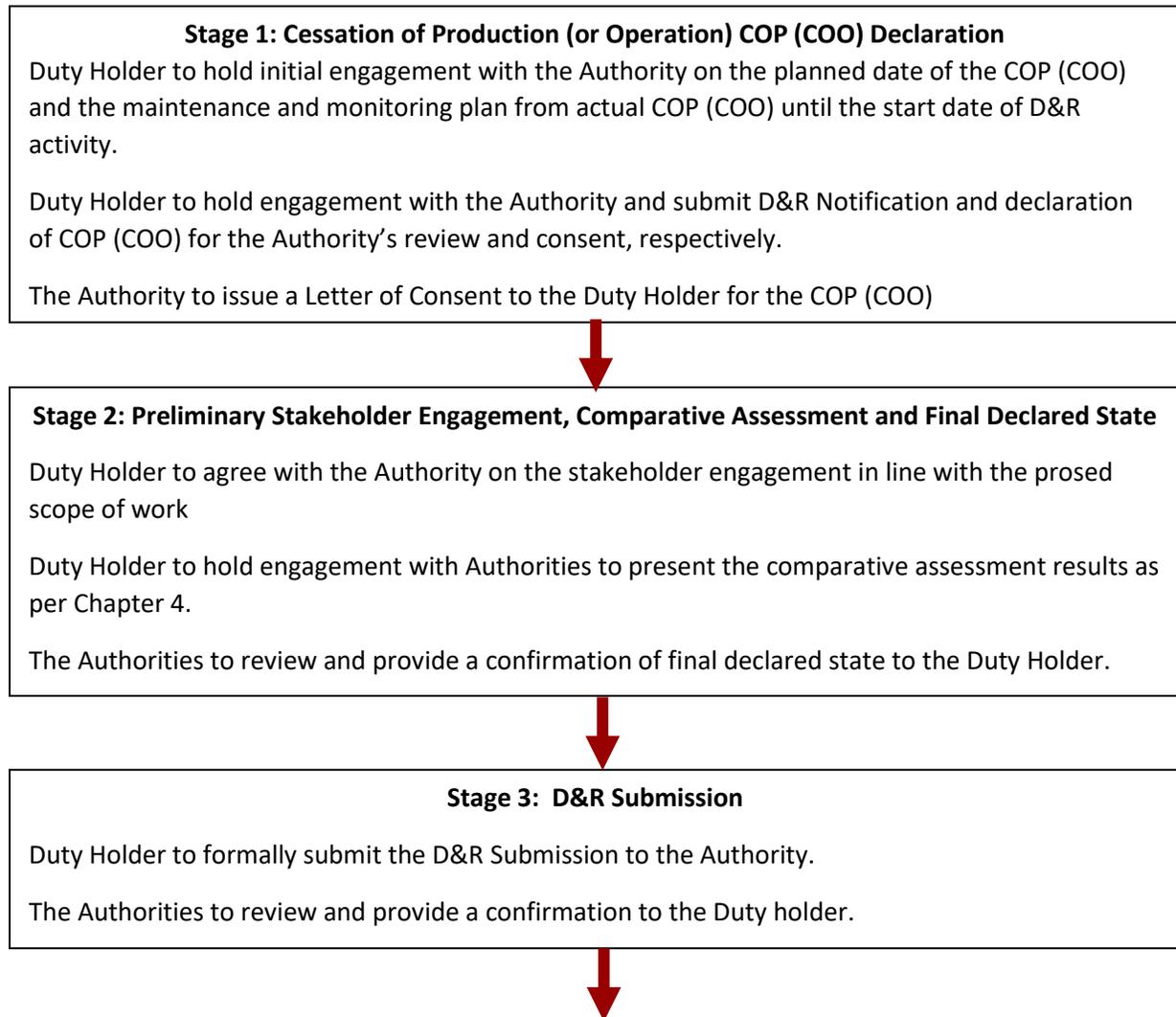
- i. COP (COO) declaration for the Authority consent
- ii. Comparative Assessment and Final Declared State
- iii. D&R Submission to the Authority

- iv. D&R Safety Case submission for issuance of D&R Safety Case Certificate by the Authority (not applicable for pipeline and well)
- v. Close-out Report to the Authority

Details of the process and expectations on timely completion are set out below.

The following flowchart indicates the key stages required for Offshore D&R Submission.

2.1 D&R Submission Process Flowchart



Stage 4: D&R Safety Case (applicable for structure only)

Prior to commencement of any physical D&R activities onsite, the Duty Holder is to submit a D&R Safety Case to the Authority.

The Authority will review the D&R Safety Case. If it meets the relevant requirements of the COMAH Regulations (Amendment) 2017, then the Authority will issue a D&R Safety Case Certificate to the Duty Holder.



Stage 5: Submission of D&R Close-out report

Upon completion of physical D&R activities onsite, the Duty Holder shall submit a D&R close-out report to the Authority. The Authority will issue a D&R completion certificate upon acceptance of the all Closeout Reports of a facility and part thereof / cluster / group of facility and part thereof / block / field.

General Notes on the D&R Submission Process

Other relevant requirements may apply and the Duty Holder may incorporate these into the process as necessary.

Procedural Notes on undertaking the D&R Submission Acceptance Process

Completion of the key activities required to fulfil Stages 1 to 5 are summarised as follows:

Stage 1

Under Stage 1 of the D&R Submission Process, the Duty Holder shall hold an initial engagement with the Authority on the planned date of COP (COO) and the maintenance and monitoring plan from actual COP (COO) until the start date of D&R activity.

When the Duty Holders are ready to execute the D&R activity, it is the responsibility of the Duty Holder to submit D&R Notification as per COMAH Regulations for Authority's review and feedback, and get consent from the Authority for declaration of COP (COO). This is done through a process, which includes engagements with the Authority. During these engagements, the Duty Holder shall provide justification and supporting documentation.

It is recommended that the Duty Holder to follow the timeframe as highlighted in the diagrams below. This is to ensure that both the Duty Holder and Authorities have sufficient time to follow the process.

Stage 2

Prior to any D&R submission, Duty Holder to submit their stakeholder engagement plan and organize engagement(s) with the Authorities to present the comparative assessment results as per chapter 4, in order for the Authorities to review and provide a confirmation of final declared state to the Duty holder.

Stage 3

In this stage, the Duty Holder shall submit a D&R Submission in electronic form along with two hard copies to the relevant Authority for review and acceptance (Petroleum Authority to be electronically carbon copied). The outline for the D&R Programme can be found in Annex Four of this Guideline.

Upon receipt of the D&R Submission, the relevant Authority will assess the D&R Submission and will provide written respond to the Duty Holder not more than 3 months from the date of receipt of complete D&R Submission.

Where there is any Material Change to the acceptance of D&R Submission, the Duty Holder should amend the D&R Submission accordingly and resubmit for assessment.

Stage 4 (Applicable for Structure only)

Upon acceptance of the D&R Submission, the Duty Holder shall submit the D&R Safety Case, prior to commencement of any physical D&R activities, as per the COMAH Regulation (Amendment) 2017 to the Authority. If the D&R Safety Case meets the relevant requirements of the COMAH Regulations, the Authority will issue a D&R Safety Case Certificate to the Duty Holder. Based on the receipt of this certificate, the Duty Holder is obliged to commence D&R activities as stipulated in the safety case, and in full compliance to relevant law.

Stage 5

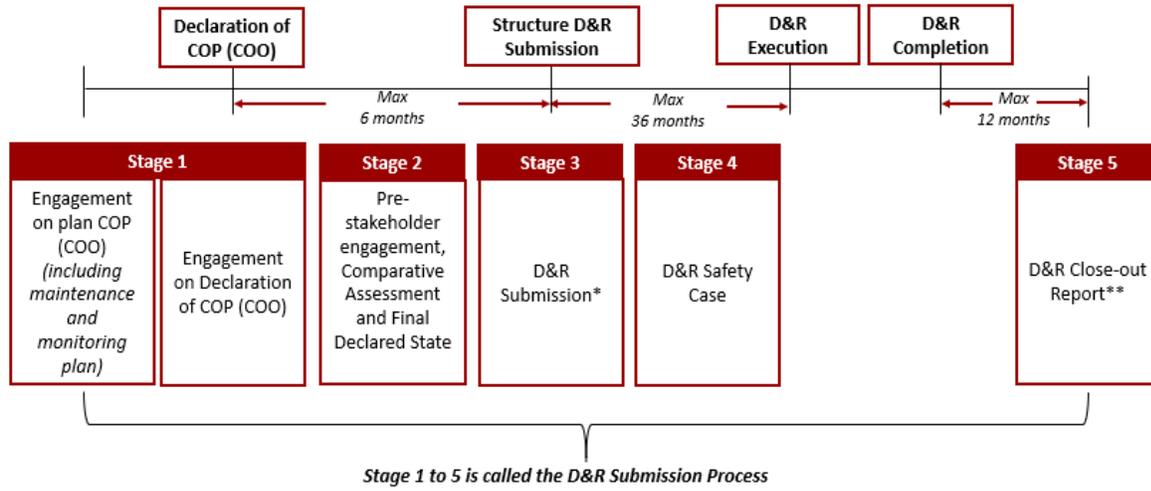
The Duty Holder shall submit D&R closeout report to the Authority within 12 months after the completion of the D&R program.

The close-out report should include the following:

- Actual D&R and waste disposal strategy vs. plan
- Actual site restoration including photos vs. plan
- Any deviations with justification to the D&R, waste disposal and site restoration strategies
- Result and outcome of the baseline monitoring including remedial actions if applicable
- Post-D&R maintenance and monitoring plan
- Safety and environmental performance
- Actual cost and schedule vs. plan
- Lessons learnt and recommendation during the various phases of the D&R process

Acceptance of any closeout reports will be communicated by the Authority via email.

Overview of the Process & Timeline for Decommissioning Offshore Structure



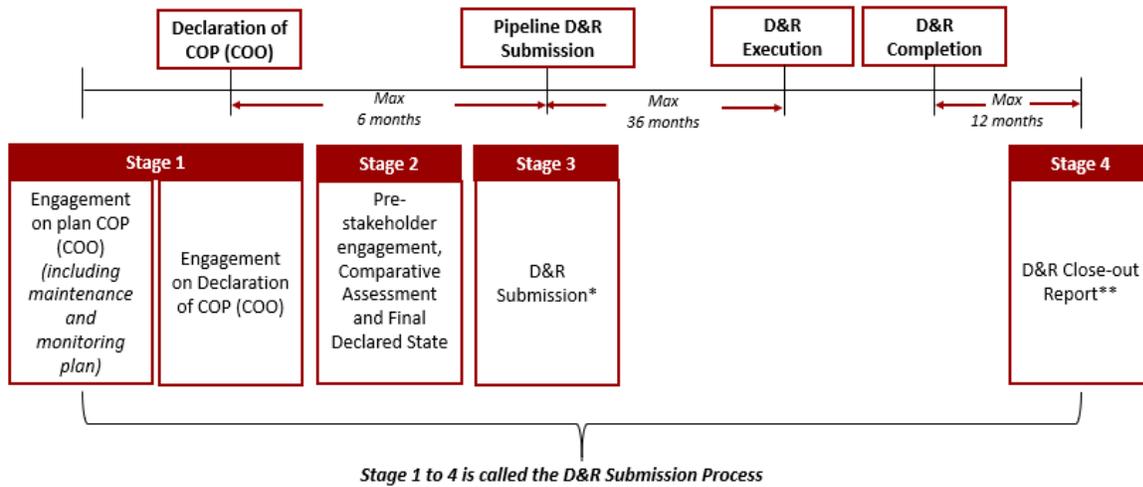
* Assessment by Authorities - Response to Duty Holder at a minimum of 3 months from the date of receipt complete submission

** Acceptance via email on the individual close-out report and issued of D&R completion certificate

Deliverables by Duty Holder

- *D&R Submissions includes:
- D&R Programme
 - D&R Notification (COMAH)
 - Written Notification (EPMA)
 - Pipeline Notification (draft)

Overview of the Process & Timeline for Decommissioning Offshore Pipeline



* Assessment by Authorities - Response to Duty Holder at a minimum of 3 months from the date of receipt complete submission

** Acceptance via email

Deliverables by Duty Holder

- *D&R Submissions includes:
- D&R Programme
 - D&R Notification (COMAH)
 - Written Notification (EPMA)
 - Pipeline Notification (draft)

3. D&R Completion Certificate

The Duty Holder is obligated to follow the agreed minimum requirements of the D&R close-out report and to keep records of submission and authority acceptance of closed out reports of all the components of a facility and part thereof / cluster / group of facility and part thereof / block / field.

When this is verified, the Authority will issue a formal D&R Completion Certificate which confirms, that the Duty Holder has effectively completed D&R activities for all elements of a facility and part thereof / cluster / group of facility and part thereof / block / field, whether they are structures and part thereof, pipelines and/or wells as per the D&R Safety Case submissions and acceptance of all the close-out reports. The issuance of D&R completion certificate to the Duty Holder may be issued with conditions including residual liability, if the final agreed declared state is not achieved.

Annex Four: Offshore D&R Programme Template

Note: *The Duty Holder should follow the guidance and the examples provided in italics before deleting same and preparing their particular Concession / Block specific Offshore D&R Submission. This submission guidelines are required to conform to the requirements of the COMAH Regulations and other relevant written laws in Brunei.*

**'CONCESSION / BLOCK NAME'
OFFSHORE
DECOMMISSIONING & RESTORATION
(D&R)
PROGRAMME**

Document Revision Control

Insert contents into the table of document revisions.

Revision	Date	Description

Distribution List

Insert contents into the table of document revisions.

Revision	Date	Description

Table of Contents

Abbreviations & Acronyms Used in this Document

Include a table of the Abbreviations used in this document.

Abbreviation	Explanation

Terms Used in this Document

Include a table of the Terms used in this document.

Term	Explanation

Figures

Include a list of Figures used in this document.

Figure	Description

Tables

Include a list of Tables used in this document.

Table	Description

Appendices

Include a table of the appendices included in this document.

Appendix	Description

1. Executive Summary

The Duty Holder should provide summary of the proposed onshore D&R activities for all related facility components of the Concession / Block, in order to provide a suitable overview of the Offshore D&R Submission.

The summary should include the followings:

- Geographical location map
- Workplace / Facility map and locations (include nearby workplace / facility)
- Onshore structures / facilities and part thereof
- Onshore wells
- Onshore Pipelines, Umbilicals & Cables (including supporting structures)
- Waste management strategy
- Project timeline and cost estimate
- Status of COP (COO) consent
- Final D&R concept

2. Components of The Proposed Offshore D&R Activities

2.1 Offshore Wells

The Duty Holder should complete Table 2 for all of the applicable offshore wells P&A associated with the proposed offshore D&R activities as far as is reasonably practicable, or indicate NA as applicable.

Table 2: Offshore Wells P&A Information			
Number	Well Type	Well Status	Well COP (COO) approval status
Platform wells			
<i>Platform name / Well name e.g. CPDP36 / CP-212</i>	<i>Oil / Gas / Water Injection</i>	<i>Producing / Close-In / Suspended</i>	<i>Approval reference and date.</i>
Subsea wells			
<i>Field / Well name e.g. B30/10-S1</i>	<i>Oil/ Gas / Water Injection</i>	<i>Suspended / Producing / Close-In</i>	<i>Approval reference and date.</i>

2.2 Topsides

The Duty Holder should complete Table 2.2 for all of the applicable workplace / facility locations associated with the proposed offshore D&R activities as far as is reasonably practicable, or indicate NA as applicable.

Table 2.2: Topsides D&R Information

Name	Location	Type	Number of Modules	Total Weight (Te)
<i>e.g WHP-289 (Topsides)</i>	<i>57° 08'37" N 2° 05'53" W</i>	<i>Modular</i>	<i>3</i>	<i>640</i>

2.3 Jacket Structures

The Duty Holder should complete Table 2.3 for all of the applicable jacket structures associated with the proposed Offshore D&R activities as far as is reasonably practicable, or indicate NA as applicable.

Table 2.3: Jacket Structure D&R Information

Name	Location	Type	Weight (Te)	Number of legs	Number of Piles	Weight of piles (Te)
<i>e.g WHP-289 (Jacket)</i>	<i>57° 08'37" N 2° 05'53" W</i>	<i>Fixed Steel</i>	<i>460</i>	<i>3</i>	<i>3</i>	<i>300</i>

2.4 Subsea Structures and Part thereof

The Duty Holder should complete Table 2.4 for all of the applicable subsea structures and part thereof associated with the proposed offshore D&R activities as far as is reasonably practicable, or indicate NA as applicable.

Table 2.4: Subsea Structure D&R Information

Type of Subsea Structure	Quantity	Weight (Te) and / or Dimensions (m)	Location	Comments / Status
<i>e.g WHP-289 (Well head)</i>	<i>1</i>	<i>32 16 x 16 x 3</i>	<i>57° 08'37" N 2° 05'53" W</i>	<i>Structure not piled</i>

2.5 Offshore Pipelines, Umbilicals and Cables

The Duty Holder should complete Table 2.5 for all of the applicable offshore pipelines, umbilicals and cables associated with the proposed offshore D&R activities as far as is reasonably practicable, or indicate NA as applicable.

Table 2.3: Onshore Pipelines, Umbilicals & Cables (including supporting structures) D&R Information

Name or number	Description	Diameter (mm)	Length (km)	Component Material	Product Medium	From / To	Burial Status	Operational Status	Comments
<i>e.g. PL-289 (Pipeline)</i>	<i>Main Export Line</i>	<i>500</i>	<i>18</i>	<i>Concrete coated steel</i>	<i>Oil</i>	<i>WHP-289 / WH-289</i>	<i>Trenched & buried</i>	<i>Operational</i>	<i>Operated with 3rd party crossing. X no. of bridge crossing</i>

e.g. U-289 (Umbilical)	Control to WH-289	100	18	Composite flexible	NA	WHP-289 / WH-289	Surface laid	Operational	Bio-degradable
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2.6 Subsea Ancillaries

The Duty Holder should complete Table 2.6 for all of the applicable subsea ancillaries associated with the proposed offshore D&R activities as far as is reasonably practicable, or indicate NA as applicable.

Table 2.6: Subsea Ancillaries D&R Information				
Type of Subsea Ancillary	Quantity	Weight (Te) and / or Dimensions (m)	Location	Comments / Status
<i>e.g. Concrete mattress</i>	16	4 6 x 3 x 0.15	<i>Along the length of PL-292</i>	NA

2.7 Seabed Debris

The Duty Holder should complete Table 2.7 for all of the applicable seabed debris interests associated with the proposed offshore D&R activities as far as is reasonably practicable, or indicate NA as applicable.

Seabed debris is defined as debris located on the seabed which has arisen from the D&R operation or from previous oil & gas development activity only. The area of seabed to be considered will depend on circumstances, but is typically taken as a 500 meters radius around the platform location that is the subject of the proposed D&R activities.

Table 2.7: Seabed Debris Information				
Type of Seabed Debris	Quantity	Weight (Te) and / or Dimensions (m)	Location	Comments / Status
<i>e.g. Scaffold materials</i>	TBC	0.25 TBC	<i>Local to WHP-292</i>	<i>Seabed survey to confirm extent of debris & any associated removal requirements.</i>

3. Offshore D&R Methodology

During preparation of the contents of Sections 3.1 through 3.8 by the Duty Holder; due cognizance should be taken of the importance of safety, the environment, socio-economic and other impacts of the offshore D&R activities on Brunei Darussalam Society in order to achieve an effective balance during the Offshore D&R Submission implementation.

For offshore structures and pipelines, the general approach is to use the baseline, conduct a Comparative Assessment (CA) and justify the final declared state. Comparative assessment can be done on a case-by-case or grouped basis and following industry best practices and international standards.

The D&R solutions from previous D&R Submission may be re-used for a new Offshore D&R scope of work, if the Authorities agree that this approach is reasonable under the circumstances.

Where applicable, environmental and social baseline surveys and / or conceptual site modelling are to be conducted for offshore assets subject to D&R in order to act as a reference point for the impact of offshore D&R activities and to inform potential remediation activities. Previous existing baseline survey data can be used where applicable and valid.

3.1 Offshore Wells

Refer Chapter 5 of this Guideline on Well Plug and Abandonment (P&A).

3.2 Topsides

The Duty Holder should adequately describe the proposed scope of work for undertaking topsides D&R activities using concise text, indicating which equipment and resources should be applied along with decontamination methodology and any anticipated challenges or interests during the proposed offshore D&R activities. For e.g. the topsides of WHP-292 is a three-legged integrated deck design which weighs approximately 640Te. Each of the three structure legs will be cut in a castellated manner at approximately 1.5m below underside deck level using an abrasive water jet cutting device; with the final cut taken at each location immediately prior to separation of the topsides from the jacket structure. The topsides will then be separated and removed from the jacket structure in a single lift utilizing a crane barge of capacity 1,000Te.

For disposal activities, where applicable, the Duty Holder should adequately describe the proposed scope of work for the safe disposal of each topsides using concise text, indicating any issues regarding the potential for trans-frontier shipment of waste or any other anticipated challenges or interests during the proposed disposal activities.

3.3 Jacket Structures

The Duty Holder should adequately describe the proposed scope of work for undertaking jacket structure D&R activities using concise text, indicating which standards, equipment and resources should be applied along with any anticipated challenges or interests during the proposed offshore D&R activities

For disposal activities, where applicable, the Duty Holder should adequately describe the proposed scope of work for the safe disposal of each jacket structure using concise text, indicating any issues regarding the potential for trans-frontier shipment of waste or any other anticipated challenges or interests during the proposed disposal activities.

3.4 Subsea Structures

The Duty Holder should adequately describe the proposed scope of work for jacket, structure, pile cutting below the seabed prior to the removal of each subsea structure using concise text, indicating which equipment and resources should be applied along with any anticipated challenges or interests and decontamination methodology to be used, during the proposed offshore D&R activities.

For disposal activities, where applicable, the Duty Holder should adequately describe the proposed scope of work for the safe disposal of each subsea structure using concise text, indicating any issues regarding the potential for trans-frontier shipment of waste or any other anticipated challenges or interests during the proposed disposal activities.

3.5 Offshore Pipelines, Umbilicals & Cables

The Duty Holder should adequately describe the proposed scope of work for undertaking offshore pipelines, umbilical & cables D&R activities using concise text, indicating which standards, equipment and resources should be applied along with any anticipated challenges or interests including decontamination methodology to be used, during the proposed offshore D&R activities.

For disposal activities, where applicable, the Duty Holder should adequately describe the proposed scope of work for the safe disposal of each offshore pipeline, umbilical & cable using concise text, indicating any risks or issues regarding the potential for trans-frontier shipment of waste or any other anticipated challenges or interests during the proposed disposal activities if applicable.

For Restoration Activities, where applicable and using concise text, the Duty Holder should adequately describe the proposed scope of restoration work. For e.g. undertake remediation of the seabed & any monitoring along the pipeline, umbilical and cable routes. Also indicate carrying out of any subsea surveys and/or water sampling as may be required to monitor damage to sensitive areas e.g. coral.

3.6 Subsea Ancillaries

For disposal activities, where applicable, the Duty Holder should adequately describe the proposed scope of work for the safe and responsible disposal of each subsea ancillary using concise text, indicating any risks or issues regarding the potential for trans-frontier shipment of waste or any other anticipated challenges or interests during the proposed disposal activities if applicable.

For restoration activities, where applicable and using concise text, the Duty Holder should adequately describe the proposed scope of restoration work. For e.g. undertake remediation of the seabed & any subsea monitoring. Also indicate carrying out of any subsea surveys and/or water sampling as may be required to monitor damage to sensitive areas e.g. coral.

3.7 Seabed Debris

The Duty Holder should adequately describe the proposed scope of work for undertaking any seabed debris D&R activities using concise text, indicating which equipment and resources should be applied along with any anticipated challenges or interests during the proposed offshore D&R activities.

For disposal activities, where applicable, the Duty Holder should adequately describe the proposed scope of work for the safe and responsible disposal of seabed debris using concise text, indicating any risks or issues regarding the potential for trans-frontier shipment of waste or any other anticipated challenges or interests during the proposed disposal activities if applicable.

3.8 Waste Streams

This section should describe the extent, if any, to which the offshore oil and gas facilities and infrastructure should be re-used, recycled, recovered or disposed of in line with applicable regulations and guidelines. In this regard, the Duty Holder should complete Table 3.8 below and thereby provide a concise description of how the waste streams arising from the proposed offshore D&R activities should be managed, including any potential issues regarding the trans-frontier shipment of waste (hazardous and non-hazardous) or any other anticipated challenges or interests related to the Offshore D&R Submission. The description should include selection of appropriate methods for remediation of contaminated waste material prior disposal.

Waste Management Hierarchy shall be applied when managing waste generated from the proposed D&R activities, which places waste prevention/reduction as the preferred option, followed by reuse and then recycle, and disposal as the last option.

Table 3.8: Waste Stream Management	
Waste Stream	Strategy
<i>e.g. List the type (e.g asbestos, mercury etc.) and amount of waste</i>	<i>Describe how and where the waste will be disposed</i>

4. Environmental Management

4.1 Environmental Features & Sensitivities

Where applicable, the Duty Holder should follow an industry standard risk assessment process and draw on the conclusions in the specific Environmental, Social & Health Impact Assessment process, (ESHIA process) for the Offshore D&R activities as referenced in Key Supporting Documents and include as appendices, the impact assessment sections. This should, where applicable, include environmental baseline surveys and / or conceptual site modelling to act as a reference point for the impact of the Offshore D&R activities. Duty Holders are required to ensure assessments are aligned to the legislative requirements of applicable Brunei law, in particular the EPMA and any regulations made thereunder.

In accordance with the industry standard process, previous baseline data and the results of previous impact assessments may be used where applicable and valid. Where there are no environmental features & sensitivities associated with the proposed offshore D&R activities, the Duty Holder should indicate NA as applicable, with summary justifications.

4.2 Potential Environmental Impacts & Mitigation

The Duty Holder should provide a concise description of the main potential environmental impacts arising as a result of undertaking the proposed offshore D&R activities for each component item, along with a description of the proposed mitigation for same after completion of the ESHIA process, where applicable.

The Duty Holder should draw a summary on the conclusions of ESHIA process undertaken, where applicable, for the offshore D&R Submission referenced in Key Supporting Documents and included as appendices, the mitigation control section. Where there are no potential significant environmental impacts associated with the proposed offshore D&R activities, the Duty Holder should indicate NA as applicable, with summary justifications.

5. Stakeholder Consultations

As per this Guideline, the Duty Holder is required to submit a preliminary Stakeholder Engagement Strategy to the Authority for consultation. The preliminary stakeholder Engagement Strategy will include a concise list of Stakeholders, who are directly affected by the proposed onshore D&R activities, a summary of the Duty Holder's engagement with the Stakeholders and provide mitigation measures for any impacts registered.

In this section, the Duty Holder should provide a summary of the final stakeholder engagement strategy to the Authority and provide outcomes from the stakeholder engagements strategy as well.

6. D&R Safety Case

This section would not be applicable in the initial D&R Submission to the Authority. However, prior to commencement of any D&R physical activities onsite, the Duty Holder shall submit the D&R Safety Case to the Authority, as per the COMAH Regulations (Amendment) 2017, providing detailed information as reflected in Schedule 5.

This submission of the D&R Safety Case is only applicable for decommissioning of offshore structures. This is not required for decommissioning of offshore wells and pipelines.

7. Management of Offshore D&R Activities

7.1 Project Management

The Duty Holder should summarize the project management strategy including Contract and Procurement (C&P) in the undertaking of the proposed offshore D&R activities using concise text and diagram.

7.2 Project Schedule

The Duty Holder should provide a Level 1 type schedule of the offshore D&R activities along with key dates and defined milestones.

The Duty Holder should implement the D&R activities in an efficient and effective manner.

However, the Authority may consider a flexible approach to Offshore D&R scheduling where the potential for increased efficiencies leading to cost savings can be demonstrated by the Duty Holder at any time during execution of the Offshore D&R activities.

7.3 Cost Estimate

The Duty Holder should provide a provisional cost estimate in 'Money of the Day' for undertaking the Offshore D&R Submission by component as applicable. Where a cost estimate is deemed as not required against a particular component of the proposed offshore D&R activities, the Duty Holder should indicate NA as applicable.

It is recognized that accuracy of D&R cost estimating has historically been unpredictable, due to complexities and uncertainties in the nature of D&R and that as a result, costs may be subject to change.

7.4 Monitoring, Maintenance & Management

Where applicable the Duty Holder should summarize the strategy for implementation of a post-D&R monitoring, maintenance and management programme associated with the Offshore D&R Submission using concise text.

8. Key Supporting Documents

The Duty Holder should list all applicable key supporting documents referenced in the Onshore D&R Submission.

Supporting documents may include document name and extract of the following, as applicable:

- Technical Studies
- Safety Studies
- Environmental, Social & Health Impact Assessment (ESHIA) Studies
- Comparative Assessment
- Other Relevant Studies

However, the Authority may request the full report, if required.

9. Venture Participant Letters of Consent

Where the Duty Holder comprises of more than one venture party then the Operator or Duty Holder of the Facility / Concession / Block assigned by the Authority should obtain authenticated letters of consent for undertaking the Onshore D&R Submission from the other venture participants.

Appendices

Duty Holder should list the appendices as referenced in this document.

Chapter 4 – Comparative Assessment (CA) Approach For D&R

This chapter provides guidance for a Duty Holder to carry out D&R feasibility by the use of a Comparative Assessment (CA) to come with an accepted D&R solution. As highlighted in Section 6 of Chapter 1 of this Guideline, the Duty Holder shall use the technical requirements, conduct comparative assessment of all feasible options and justify the final declared state.

The CA process should indicate selection criteria, internal selection processes used by the Duty Holder when screening and justifying best available onshore and offshore options for the benefit of the country.

Selection of the feasible D&R options could be done through CA on a case-by-case or grouped basis taking the technical requirements into consideration in the Comparative Assessment.

The type of oil and gas assets which may be assessed by CA include but limited to offshore structures, onshore and offshore pipelines, onshore plant, above ground and underground structures and other related infrastructure. The D&R solutions from previous D&R Submission may be re-used for a new D&R scope of work, if the Review Panel agree that this approach is reasonable under the circumstances.

Where CA is being used, Duty Holders are encouraged to utilize existing CA output, if available and appropriate, to form the basis of any analysis. The focus from Duty Holder and the Authority can then be on differences, if any, for the current D&R Submission.

The objective of this chapter is to provide recommendations on, and encourage a consistent approach to the process to be used in completing and reporting CAs in support of D&R Submission submitted to the Authority.

It is anticipated that this approach will:

- Provide clear guidance to Duty Holders on:
 - the typical structure of a CA
 - the preparations which may need to be made ahead of a CA
 - the studies and data which may be needed to inform a CA
 - an evaluation method which may be adopted during a CA
 - ways in which CA results may be presented
- Provide transparency on trade-offs between different options and criteria, such as technical, safety, environmental, societal and cost impacts
- Enable straight-forward comparison of CAs for different facilities, and aid clear communication of findings to stakeholders
- Allow a continual improvement in the quality of CA as it should be easier to apply lessons learned if a consistent approach is followed

The evaluation method provided is intended as a guide and may be adapted by the Duty Holders as considered appropriate for their own CAs.

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1. Application of This CA

1.1 Applicability

This chapter is applicable to onshore & offshore oil and gas facilities & infrastructure in Brunei Darussalam, including pipelines, from the date of issue of this Guideline.

The CA process will not apply for well P&A activities. It is expected that the Duty Holders to implement well P&A as per well P&A Guideline and will also apply their own company and industrial standards.

1.2 Timing of CA

In line with the, 'Offshore & Onshore D&R Acceptance Processes', the CA process would normally be undertaken formally following Declaration of Cessation of Production (or Operation) COP (COO).

However, it may also be appropriate to conduct preparatory CA work before then, depending on the extent and complexity of the assets concerned, to ensure reporting requirements under the COMAH Regulations are not impacted.

1.3 Efficient Use of CA

Where it is proposed to use CA for assessment of D&R options, consideration should be given to use of any CA output available from previous assessments which may be applied to the current D&R subjects. The focus from Duty Holder and the Authority can then be on significant differences, if any, for the current D&R Submission, resulting in a more efficient assessment process.

2. The CA Process

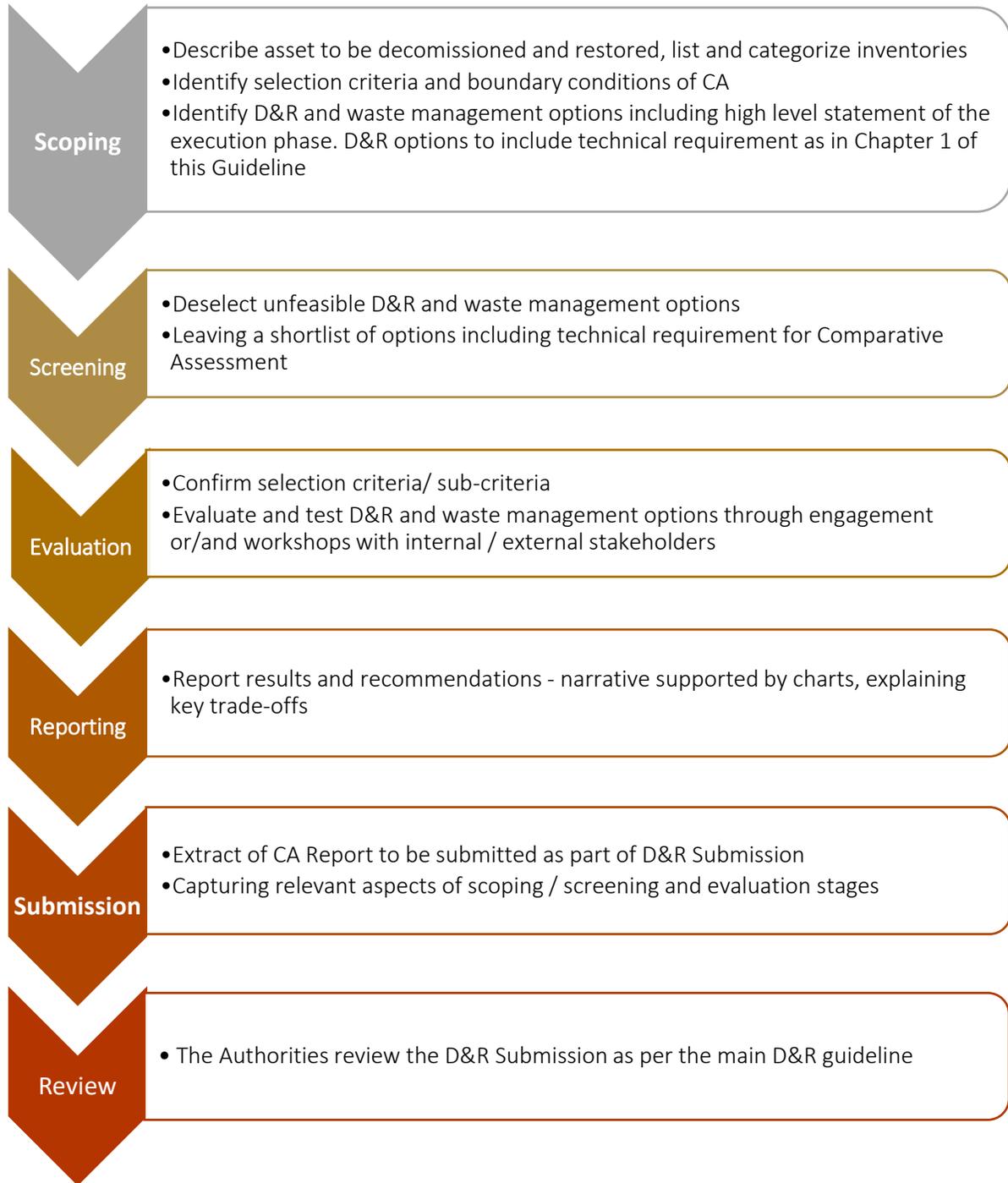
The purpose of CA is – to compare options, examine if there are real differences, and identify the “most preferred” option. The CA outcome should demonstrate if / why there are significant reasons why one option is preferable to the other options under consideration.

An overview of the CA process is presented in Figure 2-1.

The steps and activities anticipated within each phase of the CA process are described in more detail in sections 2.1 to 2.6.

Section 2.7 provides some general guidance to assist Duty Holders in planning the CA process within the wider D&R project schedule.

Figure 2-1: Overall CA Process



2.1 Scoping

2.1.1 Facilities description

To enable the extent of the D&R scope to be properly understood, each facility should be described in sufficient detail to enable consideration of the available D&R options to be assessed during the CA process.

The following lists are examples of typical information which may be needed for the different types of facilities being assessed, to help inform the CA process.

Offshore Installations and subsea structures:

- Name and location
- Type, function and age of the structure
- Weight, size and construction
- Fixing details to sea bed or foundation details onshore
- Condition
- Decontamination method
- Disposal

Pipelines:

- Pipeline identification number, age and pipeline route
- Duty (Gas export, Condensate, Water Injection etc.)
- Diameter, current wall thickness and length
- Estimate corrosion rate
- Pipeline materials and coatings (where applied)
- Burial status, mattresses, crossings & interfaces)
- Condition
- Decontamination method
- Disposal

Onshore Facilities

A site information assessment may be completed to inform CA of onshore facilities. The type of information that would be compiled and reviewed is typically as follows:

- Type, function and age of the facility
- Location of facility, proximity to populated areas, potential future land use
- Physical layouts and specification of plant, buildings etc.
- Equipment lists
- Residues or contamination anticipated to be present
- Site access / transit constraints

Disposal

Information should be provided on the proposed disposal site(s), dismantling yards (if different from disposal sites) and disposal method.

2.1.2 Boundaries

The boundaries of the CA should be clarified for each facility:

Physical boundaries in terms of extent of facilities or structures to be considered:

- Example boundaries for installations may be:
 - Jacket structure at interface with Module Support Frame (MSF)
 - Piles to required depth below seabed
 - Including drilling template (if appropriate)
 - Interconnecting bridges to other installations (if appropriate)

- Example boundaries for pipelines may be:
 - At bottom of riser / Subsea Isolation Valve (SSIV)
 - Tie in to subsea tree
 - Tie into export trunk line
 - Clarify import line interfaces from other assets

- Example boundaries for onshore facilities may be
 - Up to and including the perimeter fence of the site under consideration.
 - May also include access roads and facilities from main highway to site.

Potential for the transfer of ownership and undertakings for buildings roads or other infrastructure to the government for other future use should be considered when determining the D&R boundaries of onshore facilities and before commencing the CA.

2.1.3 Identifying the D&R options

Assets or facilities may have particular characteristics which determine available D&R options for comparison and therefore the project team developing the options to be considered should be familiar with the characteristics of the subject undergoing the CA.

Describing and presenting the D&R options in a consistent manner is important in ensuring they are compared fairly. It is generally helpful to develop and apply an option template to ensure that the information relevant to the subsequent CA is provided in a consistent manner for each of the options.

The following subsections provide guidance and examples of D&R options that may be considered when conducting a CA. However, this section is not exhaustive and it will be the responsibility of the Duty Holder to ensure all appropriate and relevant options have been identified.

Offshore Facilities and Structures:

Refer to Chapter 1 on the technical requirement for offshore structures.

The ADG also provides examples which are not repeated in detail here, it is therefore recommended that the ADG should be referenced to ensure appropriate D&R options are considered.

Initial strategic options are:

- Complete Removal
- Partial Removal
- Leave in place
 - In original configuration
 - Toppled on location

Follow-on strategies for consideration thereafter may be:

- Disposal
 - Disposal in shallow water (where suitable submerged clearance is available)
 - Disposal in deep water
 - Disposal and recycle onshore (National sites and International sites)
- Re-use as an Artificial reef
 - In existing location
 - In separate dedicated location
- Re-use as others

A number of flowcharts are provided in ADG providing examples of D&R options and the potential methods and equipment types available to support D&R option. These are not repeated here; however it is recommended that these flowcharts are referenced when developing the initial D&R options to be considered at this stage of CA.

For facilities or structures which are outside territorial waters but within the EEZ, Ref.1 must also be considered. The flowcharts and D&R options developed within the ADG are based an interpretation of Ref.1 from a regional perspective.

For structures and facilities located within the boundary of the territorial seas it is clear that Ref.1 need not be applied. However, all reasonable D&R options should be considered as part of the CA. Chapter 1 section 6.0 applies and in principle will be prioritized.

Offshore Pipelines:

Refer to Chapter 1 on the technical requirement for subsea pipelines.

Alternative options to leave in place may include rock-dumping, trenching, partial or full removal, where appropriate. The ADG gives some examples of D&R options for pipelines.

Onshore Facilities:

Refer to Chapter 1 on the technical requirement for onshore facilities.

The ADG does not cover D&R of onshore facilities and therefore can provide no context around potential D&R solutions. The D&R options to be considered and assessed should be based on industry standards. The range of D&R options available will vary depending on the type of facility subject to CA.

Onshore Pipelines:

Refer to Chapter 1 on the technical requirement for onshore pipelines.

The ADG does not cover D&R of onshore pipelines and therefore can provide no context around potential D&R solutions. The D&R options to be considered and assessed should be based on industry standards and on the characteristics of the pipelines under consideration.

2.1.4 Identifying the criteria and sub-criteria

An assessment to identify the criteria and sub criteria to be adopted in the CA should be completed at the scoping phase as this will also inform the level of supporting data and any studies that will be required.

Appropriate criteria / sub-criteria selection is key to development of a robust CA. Further detail on how to approach criteria / sub-criteria selection is provided in Section 3.0, together with examples of typical criteria and sub-criteria which may be used.

2.1.5 Stakeholder Consultation

Initial stakeholder strategy should commence at the scoping phase. This will be an internal process conducted by the Duty Holder. The Duty Holder shall submit the preliminary stakeholder engagement strategy for the Authority consultation (refer to respective chapters).

2.1.6 Grouping of the facilities or pipelines for CA

ADG implies that D&R of all facilities and pipelines should be considered on a case-by case basis. Ref.1 also identifies that each platform should be evaluated on a case-by case basis.

However, when viewed in the context of the multiple similar assets present in Brunei, it may be more practical and appropriate both from the perspective of the Duty Holder responsible for development of the CA, and for the Authority when reviewing the CA results, if similar facilities or pipelines which are being considered for decommissioning and are anticipated to have a similar D&R solution, be grouped together and assessed under one CA process.

In this case, the facilities or pipelines to be grouped together should be identified during the scoping phase and the basis and justification for such grouping should be documented.

2.2 Screening

Depending on the potential complexities and the number of D&R options and methods identified in the scoping phase, it may be possible and beneficial to carry out a screening phase, to reduce the number of D&R options or methods to be considered before moving to the next phase, as this may reduce the effort and time required to prepare for the CA phase.

The screening phase should result in only feasible options and or methods being carried forward to the next stage.

2.2.1 Objective of screening

An objective of the early scoping phase is to demonstrate that the widest possible review of D&R options has taken place and to ensure all options have been considered.

The subsequent screening phase may then review and screen out unrealistic options or obvious non-starters, e.g. due to clearly unacceptable safety risk.

This phase should document the reasons for reducing options to a manageable level, which will ultimately limit the effort and time expended in reaching a shortlist of D&R options.

2.2.2 Screening Method

Duty Holders may have their own screening methods for development projects in early appraisal or assess phase and such methods, if available and appropriate may be applied at this stage to screen out the marginal options.

If an existing screening method is not available, a simplified version of the evaluation method described in Section 4.0, carried out at main criteria level only, may be adopted.

It is anticipated that this phase will result in the documentation and clarification of why some of the marginal options identified during the scoping phase can be discounted at this point in the process.

2.3 Preparation

The preparation phase should commence after the shortlisted decommissioning options have been agreed. Any required supporting method statements, described in Section 2.3.2 should be completed in this phase, as far as practicable.

2.3.1 Terms of Reference

A Term of Reference for the CA should be prepared at this phase identifying:

- The shortlisted feasible decommissioning options and methods to be assessed.
- The boundaries of the CA.

- Initial identification of potential criteria and sub criteria to be adopted.
- The participants in the CA process and their roles.
- Any data requirements and any supporting studies that are envisaged to be needed to support the evaluation phase.

2.3.2 Method Statements

In order to help differentiate between the D&R options under consideration, it may be useful to develop simple high level method statements of the execution phase for each option which can be used to inform the comparison of the options.

Method statements should preferably be developed at key activity level that enables clarification of the main differentiators between the D&R methods / options under consideration.

Below are examples of the types of activity that would typically be described in the method statements, depending on the nature and complexity of the scope:

- Identification of types of vessels or major equipment proposed for the activity
- The duration each vessel is on-station or where major equipment is in use
- Numbers of supporting personnel for key tasks
- Extent of diving activity (offshore) or confined space entry (onshore)
- Description of any explosives which are planned to be used
- Number and type of major lifts
- Transfers to barges (offshore) or to transport vehicles (onshore)
- Main mobilization, demobilization and transit activities anticipated
- Extent of materials being returned to shore
- Main waste disposal activities
- Description of seabed disturbance anticipated
- Description of land disturbance anticipated onshore
- Details of materials left in situ after completion of D&R

The level of detail provided against each activity should be adequate to enable an understanding of the key differences between each option.

It may be helpful to set out the methods statements in a tabular form to enable similar activities across all the options being considered to be easily compared.

2.3.3 Supporting Data

Depending on the extent of the CA scope, range of D&R options, and availability of existing information, additional data may be required to support the CA. Supporting study work may also be carried out if necessary, to generate required data. Typical examples of supporting data are:

- Seasonal weather and sea-state data / operational constraints
- Integrity / condition of assets
- Environmental impact information (e.g. from ESHIA)

- Fishing industry overview
- Onshore receiving facilities and capabilities (dismantling, material handling, waste handling and disposal)
- Schedule and cost estimates for each D&R option, based on method statements

2.4 Evaluation

2.4.1 Confirm Criteria / Sub-Criteria

On completion of the scoping, the proposed criteria and sub criteria should be checked and reconfirmed as applicable, before initiating the evaluation phase. This will ensure the outcomes of the scoping phase are addressed. Refer to Section 3.0 for more information on selection of criteria and sub-criteria.

2.4.2 Evaluation Method

The suggested method for evaluation of D&R options is described in Section 4.0. This is a qualitative method using narrative description, with output presented in the form of colour coded charts.

2.4.3 Offshore Facilities and Structures

CAs for offshore facilities and structures should be carried out on a case by case or grouped basis, as appropriate for the assets under consideration. Brunei has a large number of structures, many of which fall under similar categories, for example, in terms of function, size, location or envisaged D&R timeline. Therefore, as described in Section 2.1.6 it may be appropriate to group similar structures which are anticipated to have a similar outcome from the CA process.

2.4.4 Pipelines Evaluation

As described in Section 2.1.6, where there are a significant number of pipelines in the field being decommissioned it may also be appropriate to group similar pipelines together and to carry out a combined CA.

For example, from the pipelines inventory generated during the scoping phase:

a) Sort pipelines inventory to group together based on similarity e.g. for offshore lines:

- Type (export line, rigid flowline, flexible flowline, jumper spools etc.)
- Medium (oil, gas, condensate, etc.)
- Size, length, coated / uncoated (by coating type e.g. concrete coated)
- On bottom status (Exposed, trenched, buried, rock dumped, etc.)
- Condition (good and recoverable, damaged etc.)
- Residues likely / Ability to clean

b) While groupings for onshore lines are generally similar to those for offshore lines, there are potentially more social or environmental impacts due to the onshore location.

Therefore, the list of similarities could be based on the following, as applicable:

- Type (rigid flowline, jumper spools etc.)
- Medium (oil, gas, condensate, etc.)
- Size, length, coated / uncoated
- Installed status (Laid on surface, trenched and buried)
- Condition (good and recoverable from trench, damaged etc.)
- Residues likely / Ability to clean
- Location in environmentally sensitive zone
- Potential future use of pipeline location
- Location in zone with potentially significant societal impact (close to residential area, schooling, or crossing roads)

c) Carry out separate CA on each group of similar pipelines

Grouping the pipelines before carrying out CA will streamline not only the CA process for the project team, but also streamline the D&R Submission review cycle by the Authorities. However, any grouping must first be agreed with the Authority to align with the requirements of the D&R Safety Case requirements under the COMAH Regulations.

2.4.5 Onshore Facilities

There is a wide range of different types of onshore facility, from small or simple plant to large and complex facilities. These factors should be taken into account when grouping any such facilities for CA purposes.

2.5 Reporting

The CA process and outcome should be recorded accurately and concisely, with sufficient content to enable a clear understanding of the outcome.

It will be beneficial to Duty Holders when developing the CA to adopt a consistent approach to the development of the CA report, including the CA summary extract which can be presented in support of a D&R Submission and subsequently in the D&R Safety Case.

This should also help the review panel when reviewing the summarised CA result.

Existing CA reports issued by Duty Holder can be used as the basis for preparing future CA reports, where considered appropriate. In this case, the focus should be on differences between the historic and current D&R scopes. Where the historic and current D&R scopes are very similar, the output of the original CA report may be used directly to determine the current D&R solution.

An outline list of contents is provided as an example in Section 2.5.1.

2.5.1 Typical CA Report Content

The report should generally include the following headings.

1. Summary Extract giving overview of CA with results
2. Introduction
3. Preparation Work
4. Comparative Assessment Process
5. Results
6. References
7. Appendices

2.6 Submission

The detailed process for review of a D&R Submission by the Authorities is described for onshore and offshore assets in respective chapters. After review of the D&R Submission, the Duty Holder is required to prepare a D&R Safety Case at such a time, as to allow them to take into account any comments from the Authorities, prior to commencement of D&R activities on site. Acceptance of the D&R Safety Case, will result in the Authority issuing a D&R Safety Case certificate to the Duty Holder.

Where CA has been used to inform the selection of D&R Concepts, there is no requirement to submit a CA report. However, the Duty Holder is required to present the key CA processes, assumptions and outcomes in a CA report summary (Stage two of D&R submission process) to the Authorities, to obtain the final declared state in support of the D&R submission and D&R Safety Case. The 'Summary Extract' can be used for this purpose (see Section 2.5.1).

2.7 Planning for CA

The Duty Holder should ensure adequate time and resource is allocated during the initial project planning stage for the scoping, screening and preparation phases of the CA process to ensure the evaluation phase is adequately informed and the evaluation is carried out at the appropriate level. The actual amount of time required will depend on the complexity, size and originality of the scope. The D&R Review and Acceptance Process, for onshore and offshore assets can be found in respective chapters, recognize the need for flexibility in determining the appropriate timescales for submission, review of the D&R Submission, Notifications and acceptance of the D&R Safety Case.

Therefore, rather than provide specific timelines, it sets out key principles under which the Duty Holder and the Authority are to work together in an effective and timely manner to expedite the preparation, submission and acceptance of a D&R Submission. Early CA assessment is seen as a positive step to ensuring timely submission of the D&R Submission for review by the review panel. Any comments made by the review panel should be taken into consideration and will support the preparation of the D&R Safety Case and its implementation on site.

3. Criteria Selection

3.1 Defining Criteria and Sub-Criteria

Criteria are aspects of the situation which primarily affect the success of the project and are reasons why one option may be judged to be better or worse than another.

The criteria need to be carefully defined to avoid inconsistency and misunderstanding. A full sentence is preferable; and it may help to start with the phrase “The extent to which the option maximizes/minimizes...”

The means of assessing each criterion may also be specified, as part of the criterion definition, for example “measured in terms of tonnes of CO₂ emitted during the project”.

Defining a clear set of criteria is one of the most important steps of a good CA. The set of criteria should be:

- Complete
- Non-overlapping
- Assessable

Common pitfalls in developing criteria include:

- Ignoring ‘soft’ criteria that require judgements (typically where data is not available).
- Not describing criteria clearly enough, leading to inconsistent use and interpretation.
- Considering criteria that do not differentiate the options and are irrelevant to the decision being made.
- Including too many or irrelevant criteria, thus overcomplicating the assessment.

It is often the case that similar decisions use similar general criteria. However, it is important that criteria are reviewed on a case-by-case or grouped basis to ensure they suit the specific situation. Criteria may also change over time as the context of the decision evolves, and it may be useful to revisit the list of criteria if, for example, new options are added.

D&R options are assessed based on their performance evaluated against sub-criteria. These assessments take into account a number of ‘factors’ that the sub-criteria are functions of, for example under the safety sub-criteria of “Project risk to personnel” factors which may influence the assessment of this sub-criteria may be the number of vessels involved and simultaneous operations activity, the number of personnel involved and the duration of the activity, the number of crew changes anticipated during the activity as transfers to and from the worksite may be regarded as higher risk.

Section 3.2 and 3.3 are the examples of factors that may influence other sub-criteria and illustrates a typical main and sub-criteria structure. The factors may be different ways of looking at a criterion or sub-criterion, or may be different ways in which performance can be measured.

3.2 Examples of Criteria / Sub-criteria: Offshore D&R

Table 3-1 provides a shortlist of some of the most commonly identified criteria and sub-criteria adopted in recent CA's within the industry internationally for D&R of offshore assets.

This is offered here as an example only and to assist the development of a consistent approach to CAs in Brunei Darussalam. The examples provided are not exhaustive and the Duty Holder should apply the guidance from Section 3.1 when developing their own criteria/ sub-criteria tables.

The Duty holder also provides an explanation of the applicability of each criterion, factors which influence each criterion and possible metrics which may be applied when assessing each criterion.

It is recognized that different Duty Holders and different facilities may have unique characteristics, drivers or constraints that will determine the criteria and sub-criteria to be adopted, however to improve consistency and transparency in the CA process it is recommended, where practical, a similar approach to criteria selection as defined here should adopted for CAs in Brunei Darussalam.

Table 3-1: Examples of Sub-criteria grouped by Main Criteria (Offshore D&R)

Criteria	Sub-Criteria
Safety	<ul style="list-style-type: none"> • Project Risk to personnel – Offshore • Project Risk to Other users of the sea
Environmental	<ul style="list-style-type: none"> • Marine Impact of Operations Spills • Energy/ emissions / resource consumption
Societal	<ul style="list-style-type: none"> • Commercial impact on fisheries • Socio-economic impact on communities and amenities
Technical	<ul style="list-style-type: none"> • Risk of major project failure • Technology demands
Economical	<ul style="list-style-type: none"> • Comparative Cost • Cost Risk / Uncertainty

3.3 Examples of Criteria / Sub-criteria: Onshore D&R

For assessment of D&R options for onshore assets, the main criteria would typically be the same as for offshore assets. However, there may be differences in some of the sub-criteria, in order to reflect the differing nature of the onshore assets and the potential impacts of onshore D&R.

A comparison between typical example sub-criteria which may be used for assessment of offshore and onshore D&R, and where they may differ, is presented in Table 3-2.

Table 3-2: Example Sub-criteria for Offshore & Onshore D&R

Criteria	Sub-Criteria (Offshore)	Sub-Criteria (Onshore)
Safety	<ul style="list-style-type: none"> Project Risk to personnel – Offshore Project Risk to Other users of the sea 	<ul style="list-style-type: none"> Project Risk to personnel at onshore D&R site Project Risk to Other users of the onshore D&R site
Environmental	<ul style="list-style-type: none"> Marine Impact of Operations Spills 	<ul style="list-style-type: none"> Impact of Operations on land (spills, discharges, disturbance to land, noise)
Societal	<ul style="list-style-type: none"> Commercial impact on fisheries 	<ul style="list-style-type: none"> Commercial impact on other land users
Technical	<ul style="list-style-type: none"> Risk of major project failure Technology demands 	<ul style="list-style-type: none"> Risk of major project failure Technology demands
Economical	<ul style="list-style-type: none"> Comparative Cost Cost Risk / Uncertainty 	<ul style="list-style-type: none"> Comparative Cost Cost Risk / Uncertainty

4. Evaluating the Options

4.1 General

This section describes a suitable method for evaluating D&R options. This is based on a qualitative assessment which uses narrative description, supported by relevant information and data as appropriate, with output presented in the form of colour coded charts.

Evaluating options against criteria and sub-criteria will require technical knowledge of the options and their differentiators, and in such cases the evaluation should be performed or supported by personnel who are both familiar with the assets being considered and the D&R options being assessed.

Where data is available, it may be used as appropriate to support option assessments.

Workshop sessions can help in ensuring that the right people get a say, assumptions and resulting decisions are recorded, and relevant knowledge is used appropriately. It is therefore recommended that the use of workshops should be considered during the evaluation phase.

4.2 Key drivers / Trade offs

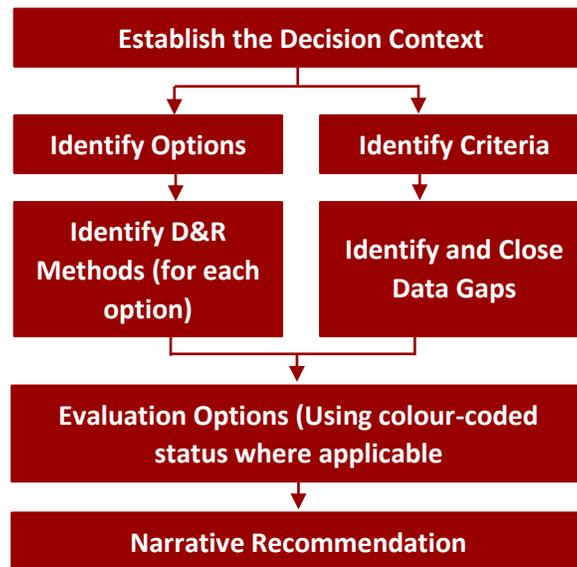
When evaluating options, it can be helpful to bear in mind the performance of the options relative to 'normal operations'. This can be captured at the criteria definition phase, by relating the context for the sub-criterion to the normal operational level of a factor. This can be useful when assessing the extent to which a sub-criterion impacts a decision, for example by comparing the difference between options with 'real world' examples for normal operations, to clarify how significant a difference really is.

Similarly, if all options provide something that is lower risk than the acceptable level for a normal operation, it may not be considered a differentiator. In such circumstances, this sub-criterion should be rated accordingly and identified as not being an influence when deciding the preferred option.

4.3 Evaluation Method

4.3.1 Evaluation Process

Figure 4-1: Evaluation Process



4.3.2 Evaluation Process

Under this evaluation method, colour coding will represent the relative preference of the options with respect to the criteria, see Figure 4-2. Options are assessed against each sub-criterion in turn. All of the relevant D&R options being considered are compared, with reference to an individual sub-criterion before moving on to the next sub-criterion. This encourages and ensures a consistent and relevant comparison of each option at sub-criteria level is achieved.

Following confirmation of the criteria and sub-criteria to be adopted, a rating template should be developed to inform and align the meaning of the colour-coded ratings to the workshop participants.

Figure 4-2: Performance Rating and Colour-Coding

Performance Rating and Colour Coding
Most Preferred (Lower impact)
Not a Differentiator (Moderate impact)
Least Preferred (Higher impact)

5. External Stakeholder Engagement

5.1 General

Stakeholder engagement activities should be conducted in accordance with the D&R Acceptance Process (Stage 2) presented for onshore and offshore D&R on respective chapters.

Key points to note are as below:

- Authority to agree on the preliminary stakeholder engagement plan prior to the stakeholder engagement with other relevant stakeholders.
- After the engagement, Duty Holder shall then submit the D&R Submission to be reviewed by the Review Panel. Any material changes resulting from the review, will require the D&R Submission will to be amended accordingly and resubmit for assessment.
- The Duty Holder shall submit the D&R Safety Case prior to any physical D&R activities commencing on site, as early as practicable to allow for taking account of any comments made by the Authority.

Chapter 5 – Well Plug and Abandonment

The content of this chapter is more specific for well plug and abandonment (well P&A) activity and it applies to both onshore and offshore wells, unless specify. This chapter will provide guidance to the Duty Holder on the process flow associated with well P&A activity from the Declaration of Well Cessation of Production (or Operation) to submission of a Well Abandonment report.

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1. Introduction

When a well is no longer in use, either due to the well having ceased to produce (or operate) or when the well has reached the economic limit or due to some technical reasons during drilling operations or due to operational constraints or because it stopped being productive or failure of exploration well etc., then there is a requirement for the well to be permanently abandoned.

When wells are required to be permanently abandoned it involves partial components of the well to be removed and zones with different pressure regimes to be permanently isolated. The primary objectives of well P&A are as follows:

- Provide downhole isolation especially pressure
- Prevent migration of formation fluids between the zones and also to surface or seabed
- Protect fresh water aquifers from being contaminated
- Minimize interference from human activities post well P&A activity.

It is recognised that each well design is unique depending on the individual well abandonment objectives. Over time, new techniques and technologies may also emerge and these will be considered on case by case basis.

2. Technical Requirement

The technical requirement in this guideline outlines the principle criteria to be considered when planning and executing the well P&A activity. In addition, the Duty Holder are also encouraged to explore various options and application of new technologies in designing and executing the well P&A.

2.1 Sub-surface Abandonment

The well abandonment design shall be based on an assessment of the subsurface isolation requirement and the well integrity conducted and documented by the Petroleum Engineers and assured by the company's subject matter expert. The subsurface assessment will provide justification for zonal isolation requirements and the well integrity assessment will identify the remedial actions required prior to any well abandonment activity commences.

The key elements to be considered by the Duty Holders are as follows:

- **Caprock Restoration**

Permanent isolation shall be done by restoring the Caprock penetrated by the well. Caprock or Shale is an impermeable rock, which is continuous over the field without natural or induced fractures. A permanent barrier shall be use to restore a suitable caprock and seal all fluid passage ways. It shall be positioned at a depth where the formation is impermeable and has a rock strength that can withstand the maximum anticipated pressure.

- **Type of permanent barrier**

Cement is currently used in wells as the prime material for abandonment. Mechanical barriers such as packer, bridge plug etc. are also commonly used as a firm support to prevent slumping of the cement slurry.

The permanent barrier shall have the following main characteristics.

- Impermeable
- Long term integrity
- Non-shrinking
- Ductile (non-brittle) – able to withstand mechanical loads/impact
- Resistant to different chemicals/substances (H₂S, CO₂ and hydrocarbons)
- Wetting, to ensure bonding to steel

- **Number and length of permanent barrier**

There shall be two barriers, each barrier of at least 30m (100ft) in length, to isolate potential outflow from the borehole to surface if the permeable zone is hydrocarbon bearing or over pressured and water bearing. The two permanent barriers may be combined into a single permanent barrier provided it is as effective, as reliable and achieving the objectives of the two independent barriers.

All permeable zones penetrated by the well that have different pressure regimes and with flow potential should be isolated from each other. Where there is unacceptable cross flow between the zones, there shall be a minimum of one barrier of at least 30m (100ft) in length to isolate those zones.

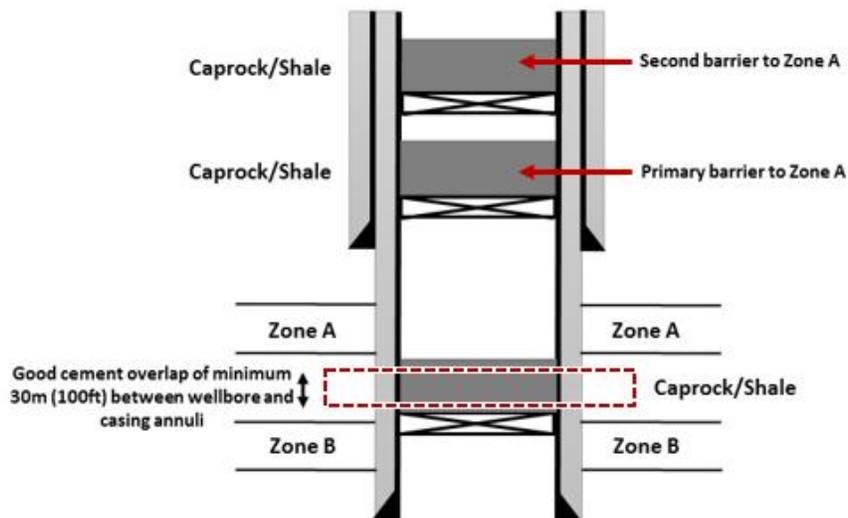


Figure 1: Example of Well P&A design in cased hole

Where there is an overlap between the cement plug in the wellbore and cement in the casing annuli, there shall also be overlap of at least 30m (100ft) in length of good cement (Figure 1).

- **Position of permanent barrier**

When selecting a suitable caprock for permanent isolation, it may be immediately above the permeable zone to be isolated or shallower and have the required sealing capability.

Where more than one permeable zones are being isolated, any potential cross flows from these zones must be acceptable by the respective Petroleum Engineers.

- **Open hole abandonment**

The same considerations to a cased-hole abandonment should be applied to open-hole abandonment. In addition to the permanent barrier set in the open-hole, an additional permanent barrier somewhere within the casing will be required, to fully seal the open-hole section (Figure 2).

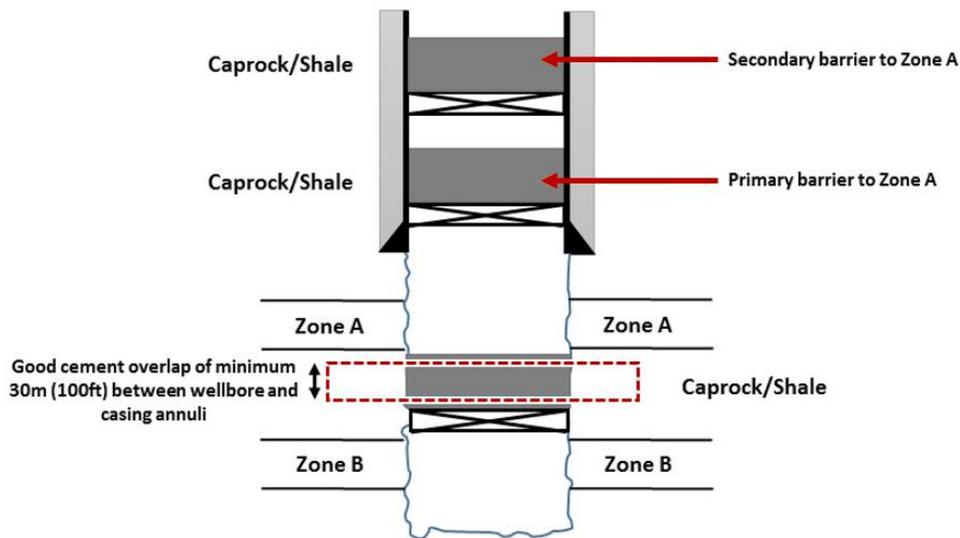


Figure 2: Example of Well P&A in open hole

- **Verification of a permanent barrier**

Once a barrier is in-place, it shall be verified to have the required sealing capability. Recommended form of verification is pressure testing or alternatively based on industry best practice. Verification shall conform to pre-defined acceptance criteria.

2.2 Post Sub-surface Abandonment Monitoring

It shall be the duty of every occupier of any workplace to take, so far as is reasonably practical, such measures to ensure that the workplace and any equipment kept at the workplace are safe (Workplace Safety and Health Order, 2009).

Prior to the removal of the wellhead, minimum of six (6) months monitoring is recommended based on risk assessment that is justified by the Duty Holder and agreed by the Authority. Well monitoring can be in any form e.g. visual inspection of bubbling, gas detection, pressure reading at wellhead etc. Records of the monitoring activity will be maintained by the Duty Holder.

In the event of any anomalies e.g. increase in pressure, gas detected etc., it is the responsibility of the Duty Holder to execute appropriate remedial actions. Subsequently, it is recommended to monitor again for a minimum period of 6 months until the wellhead is removed. The Authority may require additional monitoring depending on the severity of the anomalies.

2.3 Surface/Seabed Abandonment

Surface abandonment which includes removal of the wellhead and site restoration, to be executed after completion of the recommended well monitoring. Prior to surface abandonment, all annuli pressure shall be verified to confirm isolation and integrity.

For onshore wells, the well cellar is to be demolished to a depth that will not obstruct future use of the land (Figure 3b). All casing strings are to be typically cut off at a about 2m below the final contour elevation (though some situations may dictate cutting lower than this e.g. future land uses such as farming or urban development). Production or intermediate casing is plugged at surface with cement slurry on top of a wiper plug or a 1" thick steel plate welded across the casing (Figure 3a).



Figure 3a: Abandoned well with steel plate



Figure 3b: Excavated site with cement to be backfilled

Similarly for offshore wells, casing strings are to be retrieve to a about below natural seabed or 2m below the maximum scouring depth whichever is deeper.

In principle, the onshore well location shall be restored to the final declared state. Any well equipment and tubulars left behind could be a hazard to public, an obstruction to public activities and should be disposed of by the Duty Holder in an environmentally friendly manner.



Figure 4: Example of Well P&A Site Restoration

2.4 Well Signage - For Onshore Wells

Once surface abandonment is completed, all abandoned wells are to be marked with a signage with information on the Well Name, the name of the Operator and completion data of well abandonment. The signage must be visible at all times and not affected by weathering. Physical signage remains a requirement until at a time of transfer of ownership, or the final declared state is achieved. Example of the signage is in Figure 5 below:

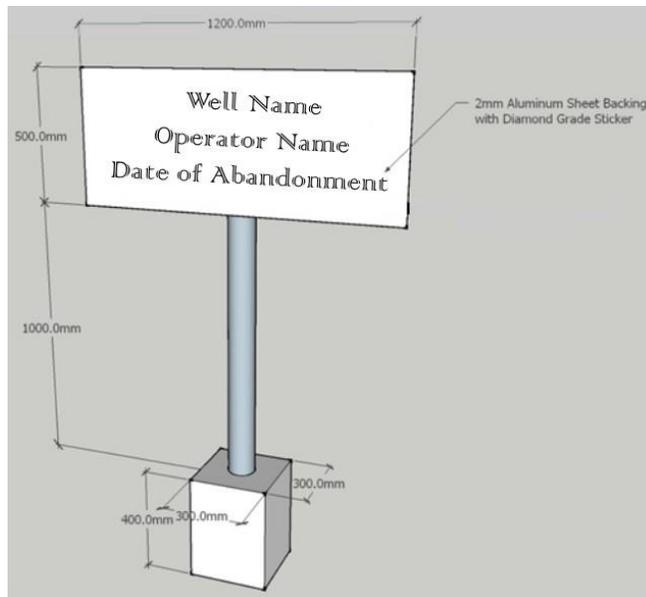


Figure 5: Example of Well P&A Signage

3. Well Plug and Abandonment Submission

The Duty Holder having received consent for the Declaration of Well COP (COO) from the Authority shall submit the following, which shall collectively be referred to as 'Wells P&A Submission'.

The contents of the 'Well P&A Submission' consist of a total of four items to be submitted to the Authority as follows:

- (1) The Well Plug and Abandonment Programme, as per Annex Four of these Guidelines
- (2) The Notification of Well Operation (NOWO), as per COMAH Regulations
- (3) The D&R Notification, as per COMAH Regulations
- (4) Written Notification of Prescribed Activity (applicable for Surface/Seabed Abandonment), as per EPMA

The expectation however remains, that the contents provided under each item in the Well P&A Submission should be sufficiently detailed such as to demonstrate that a viable strategy and associated cost estimate has been suitably developed by the Duty Holder to enable the Authority to make the requisite decisions on whether the D&R Notification, the Well P&A Programme and Notification of Well Operation are acceptable for the well concerned.

The Well Plug and Abandonment Programme should follow the model template set out in Annex Five of these guidelines, in line with the description of the materials to be provided under each section heading. The model template is fit for purpose for use across all Brunei Darussalam well P&A activities and fully satisfies the requirements for adequately describing how well P&A is to be conducted.

3.1 Well P&A Programme

The Well P&A Programme shall be completed by the Duty Holder on individual well basis outlining all the relevant information associated with the well P&A activity. The contents of the programme are as per Annex Five of these Guidelines:

- Executive Summary
- Hazards and Controls
- Abandonment Proposal
- Detailed Abandonment Programme
- Environmental Management
- Management of well P&A Activities

3.2 Notification of Well Operation (NOWO)

The Duty Holder shall submit the Notification of Well Operations as required under Schedule 6, COMAH.

3.3 D&R Notification

The Duty Holder shall submit the Decommissioning and Restoration Notification as required under Schedule 1A, COMAH.

3.4 Written Notification of Prescribed Activity (applicable for Surface/Seabed Abandonment)

The Duty Holder shall conduct or arrange for environmental impact assessment when involving activities related to hazardous substances;

Environmental impact assessment shall be conducted when involving activities related to hazardous substances;

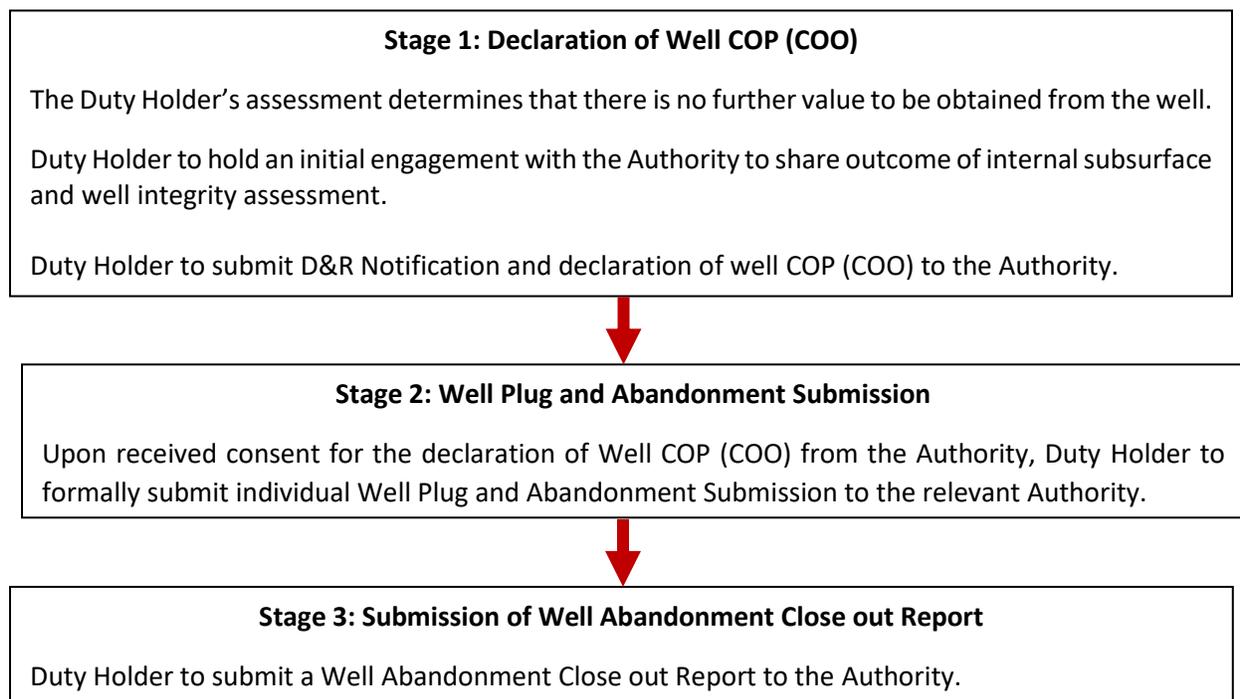
- Construction, refurbishment and decommissioning of pipelines and onshore workplaces and facilities.
- Processing, transporting, handling, storing and disposal.

A Written Notification of Prescribed Activity as required in reference to Section 9 of the Environmental Protection and Management Act, Chapter 240 (EPMA) shall be submitted to the Authority. Duty Holder shall provide the approved Written Notification of Prescribed Activity as part of its D&R Submission.

4. Well Plug and Abandonment Submission Process & Timeline

Details of the process and expectations on timely completion are set out below. The following flowchart indicates the key stages required for Well P&A Submission.

4.1 Well P&A Submission Process Flowchart



STAGE 1: Declaration of Well COP (COO)

Under Stage 1 of the well P&A Submission process, the Duty Holder shall conduct an engagement with the Authority to share outcome of internal subsurface and well integrity assessment with justifications including supporting documents for well COP (COO) declaration. The engagement will be in the form of presentation style and the outline of the contents includes but not limited to the followings:

Key Data	Supporting Document
Well information: <ul style="list-style-type: none"> ✓ Platform / area ✓ Well number and type e.g. X-152, Oil ✓ Block ✓ Reservoir ✓ Well age and closed in period ✓ Well conditions (integrity & HSE issues) ✓ Potential remaining reserves (Develop ultimate recovery) ✓ Cumulative production ✓ HCIIP, Recovery factor (current and TQ) ✓ Well status e.g. plugged/open ✓ Other drainage points with colour coded for well status ✓ Completion Status ✓ Uphole opportunity ✓ Future Wellbore Utilization (yes/no) 	<ul style="list-style-type: none"> ▪ Well Production history ▪ Reservoir map with latest fluid contact ▪ Cross-section with latest fluid contact ▪ Current and proposed completion diagram ▪ Reservoir penetration chart ▪ Well logs with latest fluid fill ▪ Supporting evidences on well integrity ▪ Well pressure data ▪ Drainage points and their current status in detail ▪ Annual Review of Petroleum Resources
Well Justification: <ul style="list-style-type: none"> ✓ Selection Criteria e.g. Economic, Well Integrity 	<ul style="list-style-type: none"> ▪ Economic – opportunity scope, cost, production profile and economic outcome. ▪ Opportunity – reservoir map, cross section reservoir map, well logs, penetration chart, upside potential, deeper reservoir, re-use well
Well Planning: <ul style="list-style-type: none"> ✓ Cost ✓ Schedule 	<ul style="list-style-type: none"> ▪ Historical and Level 2 well cost ▪ Historical and Level 2 schedule

Such engagement shall be conducted with the Authority at a minimum of 14 months prior to the well P&A execution start date. As a follow up from the engagement, maximum of 2 months after such engagement, the Duty Holder shall submit a D&R Notification as per requirement from COMAH for the Authority's review and feedback, and a formal letter of Well COP (COO) Declaration for the Authority's consent.

STAGE 2: Well Plug and Abandonment Submission

Prior to the Well P&A Submission, the Duty Holder to hold an engagement with the Authority to ensure alignment of expectations and requirement of the well abandonment (Well P&A Proposal).

The Duty Holder shall then submit a well P&A submission in electronic format along with two hard copies to the relevant Authority for review and acceptance (Petroleum Authority to be electronically carbon copied).

Where there is any Material Change to the acceptance of a well P&A submission, the Duty Holder shall amend the Well P&A Submission accordingly and resubmit for assessment.

STAGE 3: Submission of Well Abandonment Close out Report

The Duty Holder shall submit the Well Abandonment Close out Report with a cover letter confirming that the well P&A has been completed, to the Authority not later than one month after the completion of the surface abandonment. However, in the case where surface abandonment is not possible immediately after the completion of subsurface abandonment, Duty Holder shall submit the Well Subsurface Abandonment Close Out Report one month after the completion of the subsurface abandonment (successful 6 months well monitoring) and follow up with the complete Well Abandonment (Subsurface And Surface Abandonment) Close Out Report one month after the completion of surface abandonment.

The close out report includes but not limited to the followings:

- Actual well P&A execution
- Actual site restoration including signage with photos for onshore wells or the planned site restoration in the case where surface abandonment is not possible immediately after subsurface abandonment in the subsurface abandonment report
- Any deviations (from well P&A programme submission) with justifications
- Result and outcome of the well monitoring including remedial actions, if applicable
- Safety and environmental performance during well abandonment
- Actual abandonment execution duration and actual cost vs. plan with descriptions for deviations
- Lessons learnt and recommendation during the various phases of the Well P&A process

4.2 Well P&A Process Timeline

The expected timeline for the Well P&A submission process are outline in Figure 6 below. The key milestones along the process are as follows:

- a) It is anticipated that the first engagement with Authority to be held minimum of fourteen (14) months before the execution of the well P&A.
- b) The Letter of COP (COO) Declaration is to be submitted to the Authority maximum of two (2) months after the engagement for the Authority's consent.
- c) The Well P&A submission is to be submitted to the Authority maximum of twelve (12) months after the consent of the COP (COO) Declaration.

- d) Upon completion of the sub-surface abandonment, it is recommended to conduct a minimum of 6 months monitoring prior to removal of the wellhead and subsequently surface abandonment.
- e) Duty holder shall submit the well subsurface abandonment close out report one month after the completion of the subsurface abandonment (after completion of the 6 months monitoring period)
- f) Well P&A close-out report is to be submitted one (1) month after the completion of well P&A activity including site restoration.

All wells are expected to be plugged and abandoned within 3 years upon receiving consent of the COP (COO) declaration.

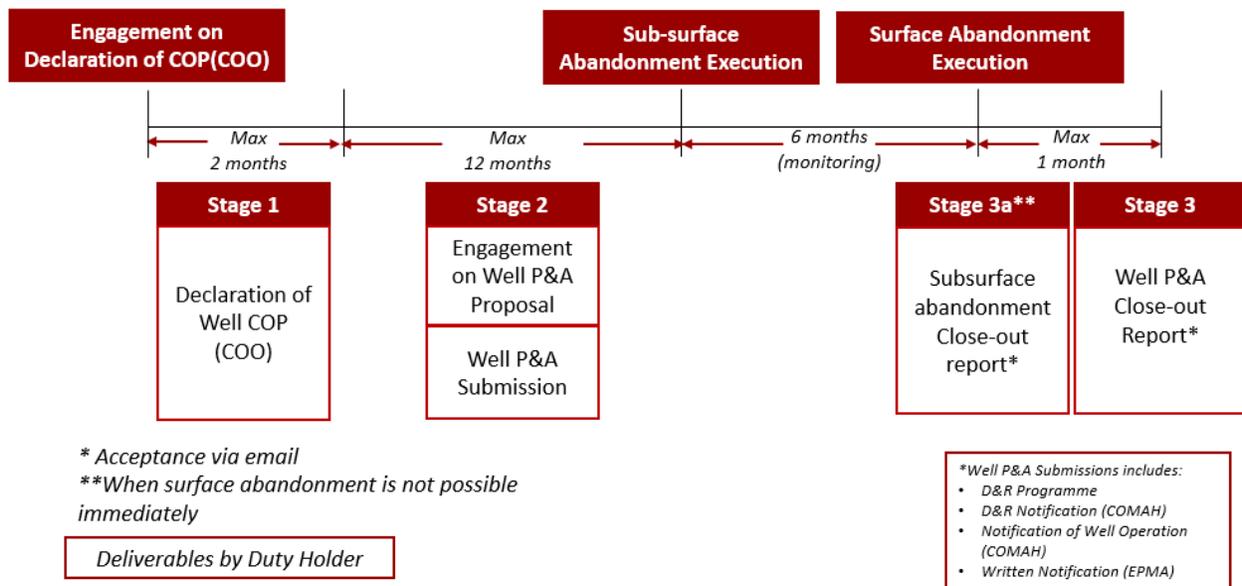


Figure 6: Well P&A Submission Timeline

5. Annex Five: Well Plug and Abandonment Programme Template

'WELL NAME'

'CONCESSION /BLOCK NAME'

ONSHORE / OFFSHORE

WELL PLUG AND ABANDONMENT PROGRAMME

Document Revision Control

Insert contents into the table of document revisions.

Revision	Date	Description

Distribution List

Insert contents into the table of applicable distribution.

Revision	Date	Description

Abbreviations & Acronyms Used in This Document

Include a table of the Abbreviations used in this document.

Abbreviation	Explanation

Terms Used in This Document

Include a table of the Terms used in this document.

Term	Explanation

Figures

Include a list of Figures used in this document.

Figure	Description

Tables

Include a list of Tables used in this document.

Table	Description

Appendices

Include a table of the appendices included in this document.

Appendix	Description

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- 2.3 Concurrent Production and Rig Activities
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- 5.1 Potential Environmental Impacts & Mitigations
- 5.2 Waste Management

6.0 Timeline and Cost Estimate

- 6.1 Timeline
- 6.2 Cost Estimate

1. Executive Summary

The Duty Holder will provide summary of the proposed Well Plug and Abandonment activities for all related components of the well, in order to provide a suitable overview of the Well Plug and Abandonment Submission. The summary includes but not limited to the followings:

- Geographical location map
- Field/Block map and locations (include nearby wells and/or facility)
- Well to be abandoned and current status
- Production pipelines associated to the well abandonment
- Waste management strategy
- Project timeline and cost estimate
- Final Well P&A concept

2. Hazards and Controls

2.1 Hazard / Risk Register

Identify the potential hazard / risk associated with the well plug and abandonment activity including but not limited to the followings:

- impact of any associated risks
- likelihood of the risks occurring
- mitigation actions to minimize the impact or prevention from risk to occur
- recovery actions in the event that the risk does happen
- action party to carry out the mitigation actions
- status of the mitigation measures

2.2 Well Control Equipment and Test Summary

Summary of all the well control equipment that will be tested in accordance of applicable standards.

2.3 Concurrent Production and Rig Activities

Highlight the concurrent production and rig activity associated with this particular plug and abandonment operations, if applicable. Any hazard/risk associated with the concurrent production and rig activities will be captured in the hazard and risk register in Section 2.1

2.4 Emergency Response Plan

To include but not limited to the followings:

- Crisis and Emergency Response Management Team organization chart

- A table of the list of the Crisis and Emergency Response Management team members that will be on duty during the particular well abandonment activity with their job position and emergency contact number
- Summary details of arrangements in place to deal with any relevant emergencies pertaining to planned or unplanned scenarios.

3. Abandonment Proposal

3.1 Well Location and History

Description of the location of the well proposed to be abandoned. Insert location map especially onshore wells in the vicinity of residential/public areas.

Historical well summary of the proposed well to be abandoned which includes but is not limited to key events and dates i.e. spud date, recompletion, well intervention, production, integrity issues, closed-in date, reason for closed-in etc.

3.2 Well Production and Ultimate Recovery

Provide historical production plots. Historical production summary of the proposed well to be abandoned which includes but is not limited to initial/last production rates, cumulative production volume, current UR of the well, remaining reserves, potential up-hole recompletion etc. for each of the production zones and/or sands.

Proposed alternative drainage to produce the remaining reserves from the particular zones/sands of the well to be abandoned.

3.3 Current Well Schematic

Insert the current well schematic diagram of the proposed well to be abandoned. This schematic diagram includes and not be limited to depth referencing, elevation of drill floor, casing design, completion design including tubing and completion accessories, production zones, fish-in-hole, top of cement, suspension mechanism, etc. where applicable with the depths for each item.

3.4 Wellhead

Insert a diagram of the existing wellhead at the proposed well to be abandoned.

3.5 Well Trajectory

Insert the well trajectory diagram and a table of the well trajectory information for the proposed well to be abandoned which includes but not limited to depths, inclination, azimuth, Northing, Easting etc.

3.6 Geological Strata and Fluids

Insert a table or copy of interpreted well logs of the subsurface information penetrated by the proposed well to be abandoned which includes but is not limited to block, sand, formation tops, fluid type etc.

3.7 Pore Pressure Prediction

Insert a chart of the pore pressure prediction of the proposed well to be abandoned which includes but is not limited to low, expected and high case for both estimated reservoir pressure and fracture closure pressure (FCP) on each key horizons.

3.8 Proposed Well Schematic.

Insert the proposed well abandonment schematic diagram of the proposed well to be abandoned. The schematic diagram includes and not be limited to mechanical and cement plugs, abandonment fluids, fish left in-hole etc. where applicable with the depths information of each items.

3.9 Basis of Abandonment Design

Briefly describe the rationale of the proposed abandonment design i.e. requirement for zonal isolation plugs, setting depth for mechanical and cement plugs, cement squeeze in casing annulus etc. where applicable.

3.10 Abandonment Fluids

Summary of the abandonment fluids planned to be used during the execution of well abandonment, which includes and is not limited to fluid type and fluid density for each hole section, if more than one type of abandonment fluids is to be used.

3.11 Cementing Programme

Summary of the type of cement planned to be used during the execution of well abandonment which includes and is not limited to cement type, density, interval (thickness) and justifications of quality of cement chosen for each of the proposed section and/or cement plugs.

3.12 Monitoring

Summary of the strategy for implementation of well monitoring post subsurface abandonment associated with the well plug and abandonment activity, if applicable.

3.13 Site Restoration

Summary of the strategy for implementation of site restoration to final declared state for onshore wells.

4. Detailed Abandonment Programme

Description of detailed step by step abandonment programme to be executed. The programme includes but not limited to the followings:

- Rig Move
- Secure Well
- Retrieval of components of the well
- Subsurface Abandonment
- Surface Abandonment
- Site Restoration

5. Environmental Management

5.1 Potential Environmental Impacts & Mitigations

A description of the main potential environmental impacts arising as a result of undertaking the proposed well plug and abandonment activity particularly for onshore wells which are in the vicinity of residential and public areas, along with a description of the proposed mitigation, where applicable.

5.2 Waste Management

Describe how the waste streams arising from the plug and abandonment activity will be managed including any potential issues regarding the transportation of hazardous and non-hazardous waste, if applicable. Also includes how the well components will either be re-used, recycled, recovered or disposed of in line with applicable regulations.

6. Timeline and Cost Estimate

6.1 Timeline

Summary of the well abandonment execution timeline and duration along with key dates and defined milestones. Insert current drilling sequence, where applicable.

6.2 Cost Estimate

Provide a provisional breakdown and total cost estimate for undertaking the well plug and abandonment activity. Noted that costs may be subject to change.

