



# Perspectives on good process and lessons learned

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14 May 2019

**A global quality assurance and risk management company**

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OUR PURPOSE

**TO SAFEGUARD  
LIFE, PROPERTY  
AND THE ENVIRONMENT**

## Global reach – local competence

**12,000**

employees

**150+**

years

**100+**

countries

**100,000+**

customers

**5% R&D**

of annual revenue

**MARITIME**



**OIL & GAS**



**ENERGY**



**BUSINESS  
ASSURANCE**



**DIGITAL  
SOLUTIONS**



Technology & Research

Global Shared Services

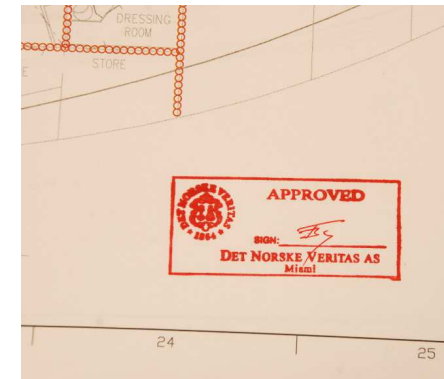
## We apply deep insights and diverse industry domain competence

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- We **classify, certify, verify and test** against regulatory requirements, standards and recommended practices
  - We develop new **rules, standards and recommended practices**
  - We **qualify new technologies** and operational concepts
  - We give **expert advice** on safety, technology, data management, efficiency, performance, and risk management

## DNV GL services for Seabed Mining

- Certification services for surface and subsurface equipment including underwater installations and underwater working machines
- Process monitoring
- Business assurance (quality monitoring)
- Environmental services (risk management, environmental impact assessments etc.)
- Project risk management

**Most of our support can be provided as Third Party or Second Party services!**



## Improving safety and performance

Setting safety standards

Sharing knowledge

Working with the industry and authorities in 130 countries

Enhancing performance

Technology, safety, competence, business and environment



# Service Documents Development Process

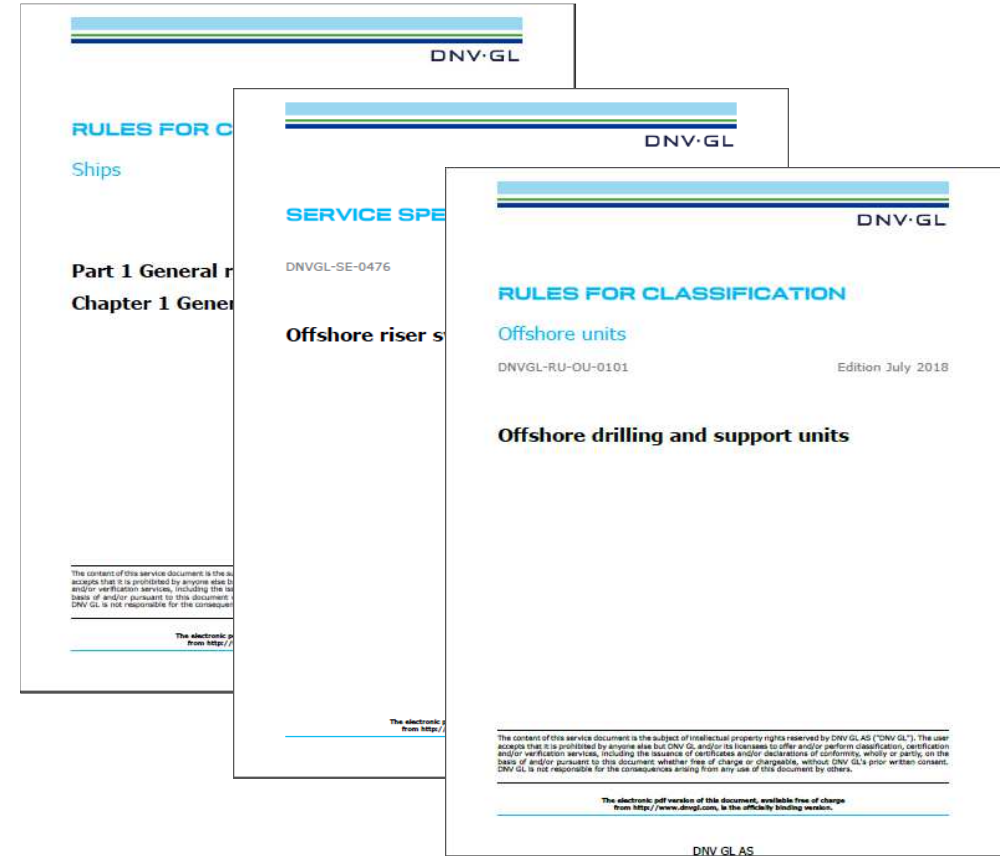
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# Basis for our Service Documents Development

## Service Documents Management

### 1 OBJECTIVE

The objective of this instruction is to ensure consistency in the way service documents are governed and managed throughout their life cycle including clarification of authorities, responsibilities and tasks for key stakeholders involved.



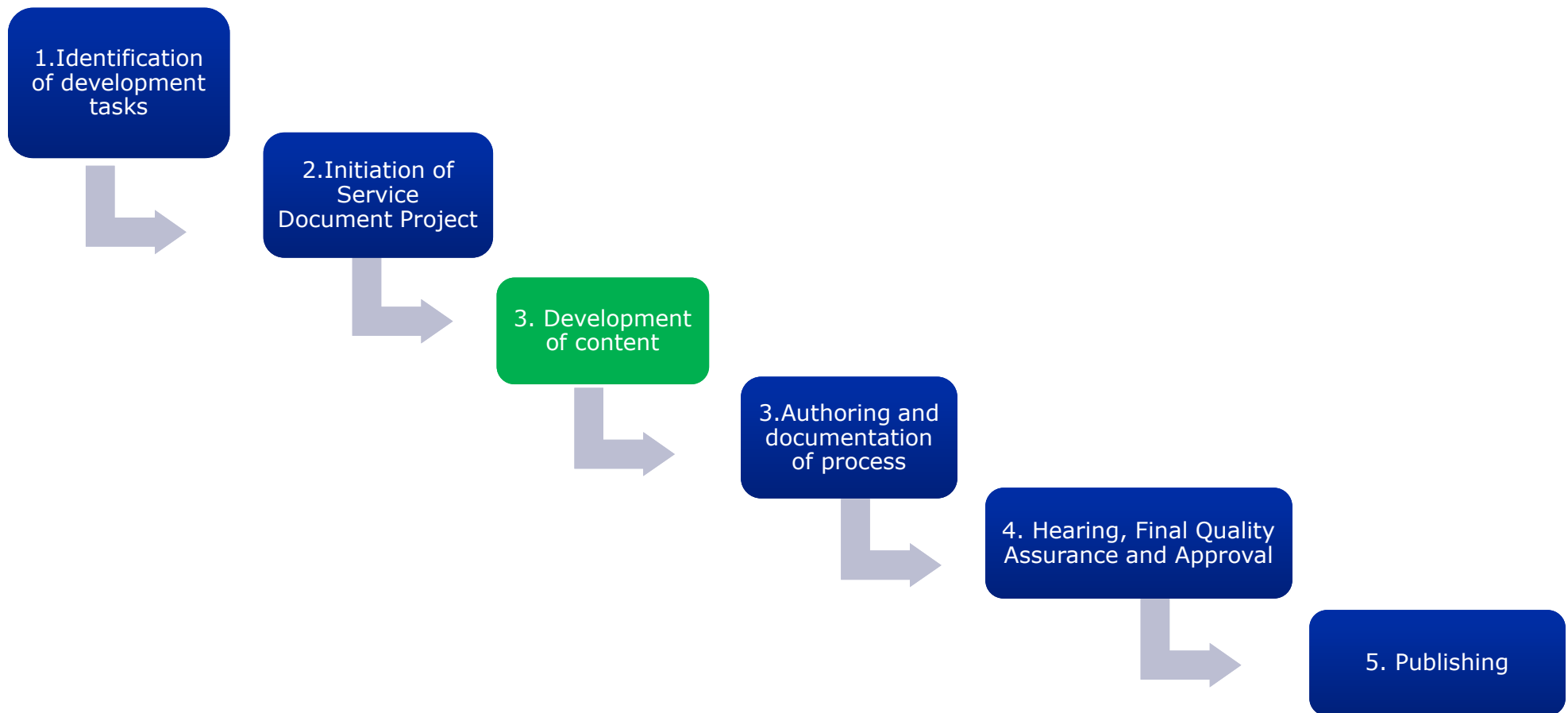


## Most essential ...

- Identification of correct development need
- Early identification important to meet needs of all parties involved
- Time from identification to publication



## Service document process – Development and Maintenance

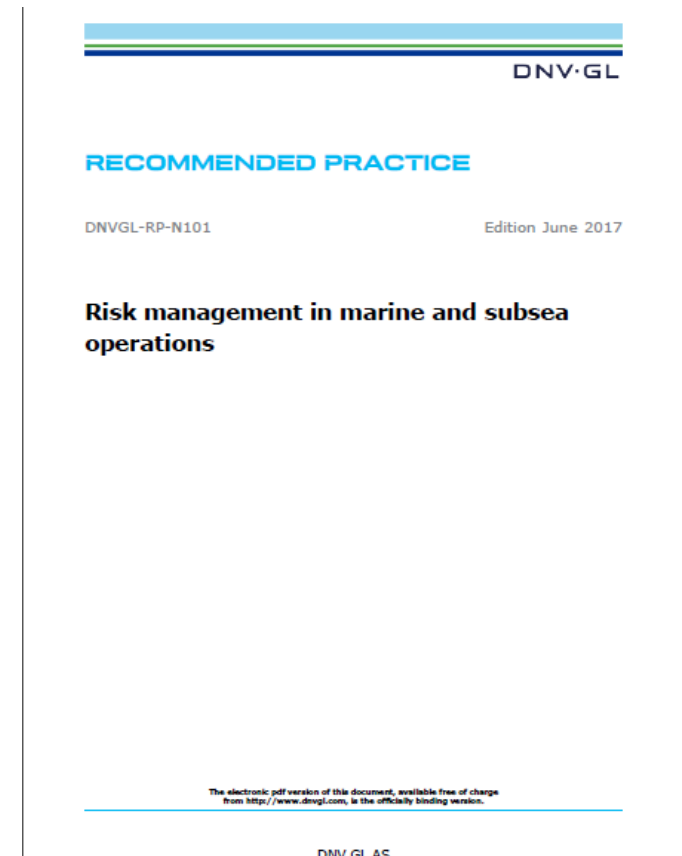
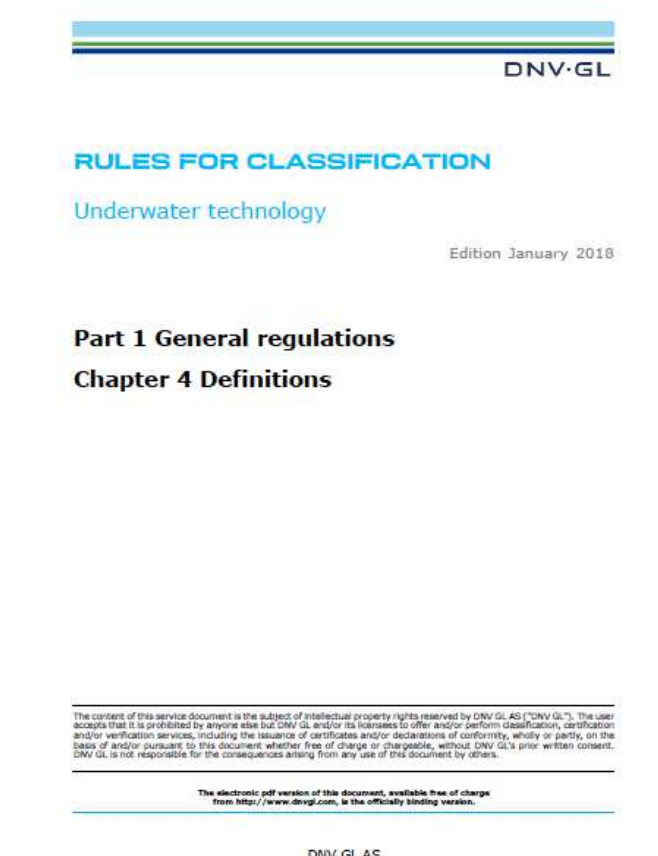
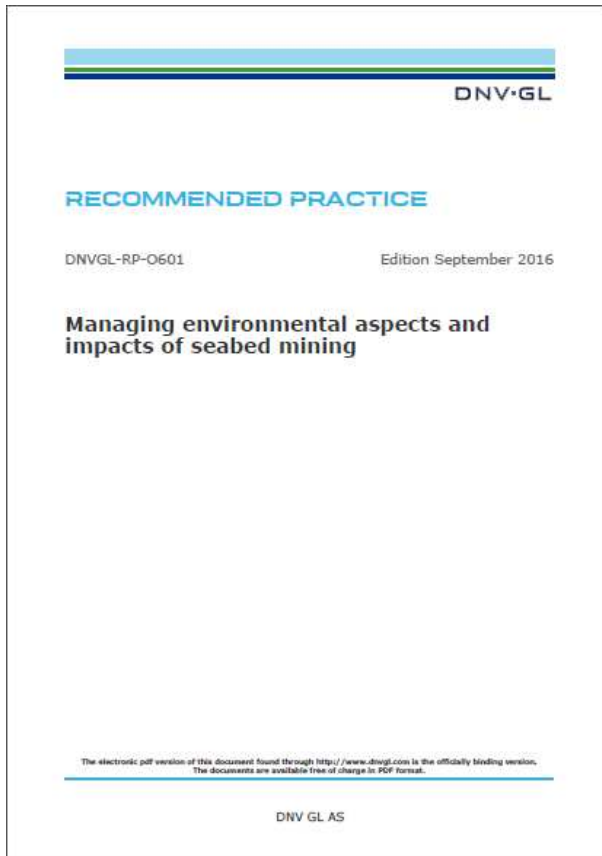


# DNV GL Rules and Standards

The screenshot shows the DNV GL website interface. At the top left is the DNV GL logo. To the right is a search bar. Below the logo is a dark blue header with the text "DNV GL RULES AND STANDARDS". Underneath is a search area with a "Find document" input field, a "current as of" section with two dropdown menus (set to "2019" and "05"), and a link for "Advanced content search". The main content is divided into three columns: "MARITIME", "OIL AND GAS", and "ENERGY". Each column has a header image and a list of document types with right-pointing arrows. The Maritime column lists: "DNV GL rules for classification: General (RU)", "DNV GL rules for classification: Ships (RU-SHIP)", "DNV GL rules for classification: High speed and light craft (RU-HSLC)", "DNV GL rules for classification: Inland navigation vessels (RU-INV)", "DNV GL rules for classification: Yachts (RU-YACHT)", "DNV GL rules for classification: Underwater technology (RU-UWT)", "DNV GL rules for classification: Naval vessels (RU-NAVAL)", and "DNV GL rules for classification: Floating docks (RU-EN)". The Oil and Gas column lists: "DNV GL service specifications (SE)", "DNV GL standards (ST)", and "DNV GL recommended practices (RP)". The Energy column lists: "DNV GL service specifications (SE)", "DNV GL standards (ST)", and "DNV GL recommended practices (RP)".

<https://rules.dnvgl.com/ServiceDocuments/dnvgl/#!/home>

# Examples of DNV GL standards for seabed mining



## Example for a development need

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*Deep-Sea Mining: Challenges of Going Further and Deeper  
Advances in Marine Research and Subsea Technology Beyond Oil & Gas  
UMC 2018 · Grieghallen · Bergen, Norway*

# **Towards operational environmental threshold levels for exploitation of mineral resources in the deep sea**

Jens Laugesen<sup>1</sup>, Karsten Hagenah<sup>2</sup>, Øyvind Fjukmoen<sup>1</sup>, Lucy Brooks<sup>1</sup> and  
Tor Jensen<sup>1</sup>

## Recommendations

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- Only develop as many standards as necessary
  - Many available standards can be adopted to seabed mining
- ... but, if there is any doubt or uncertainty about requirements (e.g. for a process or a product)

**→ Write it down**

# Thank you for your attention

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**SAFER, SMARTER, GREENER**

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