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Global Standard for Responsible Supply of Marine Ingredients

Fishery Assessment Methodology and Template Report V2.0

Fishery Under Assessment	**Atlantic Wolffish *Anarhichas lupus* Northeast Artic Subareas 1,2**
Date	February 2020
Assessor	Jim Daly
Stock Pass	Northeast Artic Subareas 1,2
Stock Fail	

Application details and summary of the assessment outcome				
Name: Norway Seafood Federation (NSF)				
Address:				
Country: Norway		**Zip:**		
Tel. No.:		**Fax. No.:**		
Email address:		**Applicant Code:**		
Key Contact:		**Title:**		
Certification Body Details				
Name of Certification Body:		**SAI Global Ltd**		
Assessor	**Peer Reviewer**	**Assessment Days**	**Initial/Surveillance/ Re-approval**	**Whole fish/ By-product**
Jim Daly	Conor Donnelly	0.5	Initial	By-product
Assessment Period	2020			

Scope Details	
Management Authority (Country/State)	EU/Norway
Main Species	Atlantic Wolffish *Anarhichas lupus*
Stock:	ICES Subareas 1,2
Fishery Location	Northeast Artic
Gear Type(s)	Demersal trawl
Outcome of Assessment	
Peer Review Evaluation	
Recommendation	**PASS**

Assessment Determination
If any species is categorised as Endangered or Critically Endangered on the IUCN Red List, or if it appears in the CITES appendices, it cannot be approved for use as IFFO RS raw material. Atlantic Wolffish *Anarhichas lupus* does not appear as Endangered or Critically Endangered on the IUCN Red List, nor does it appear in the CITES appendices; therefore, Atlantic Wolffish *Anarhichas lupus* is eligible for approval for use as IFFO-RS raw material. The species is not subject to a species-specific research and management regime sufficient to pass a Category C assessment. The species is currently listed as data deficient (DD) on IUCN's website. The comparative lack of scientific information on the status of the population in the assessment area means that a risk-assessment style approach must be taken. The fishery was assessed using the risk-based Productivity, Susceptibility Analysis (PSA) as per IFFO-RS v 2.0 procedures for Category D species. The species has **PASSED** failed this risk-based assessment (Clause D4.1; D4.2). Atlantic Wolffish *Anarhichas lupus* is approved in the assessment area by SAI Global assessors for the production of fishmeal and fish oil under the IFFO-RS v 2.0 by-products standard.
Peer Review Comments
Notes for On-site Auditor

HOW TO COMPLETE THIS ASSESSMENT REPORT

By-products

The process for completing the template for **by-product raw material** is as follows:

1. ALL ASSESSMENTS: Complete the Species Characterisation table with the names of the by-product species and stocks under assessment. The '% landings' column can be left empty; all by-products are considered as Category C and D.
2. IF THERE ARE CATEGORY C BYPRODUCTS UNDER ASSESSMENT: Complete clause C1 for **each** Category C by-product.
3. IF THERE ARE CATEGORY D BYPRODUCTS UNDER ASSESSMENT: Complete Section D.
4. ALL OTHER SECTIONS CAN BE DELETED. Clauses M1 - M3, F1 - F3, and Sections A and B do not need to be completed for a by-product assessment.

By-product approval is awarded on a species-by-species basis. Each by-product species scoring a pass under the appropriate section may be approved against the IFFO RS Standard.

SPECIES CATEGORISATION

The following table should be completed as fully as the available information permits. Any species representing more than 0.1% of the annual catch should be listed, along with an estimate of the

proportion of the catch each species represents. The species should then be divided into Type 1 and Type 2 as follows:

- **Type 1 Species** can be considered the 'target' or 'main' species in the fishery. They make up the bulk of annual landings and are subjected to a detailed assessment.
- **Type 2 Species** can be considered the 'bycatch' or 'minor' species in the fishery. They make up a small proportion of the annual landings and are subjected to relatively high-level assessment.

Type 1 Species must represent 95% of the total annual catch. Type 2 Species may represent a maximum of 5% of the annual catch (see Appendix B).

Species which make up less than 0.1% of landings do not need to be listed (NOTE: ETP species are considered separately). The table should be extended if more space is needed. Discarded species should be included when known.

The 'stock' column should be used to differentiate when there are multiple biological or management stocks of one species captured by the fishery. The 'management' column should be used to indicate whether there is an adequate management regime specifically aimed at the individual species/stock. In some cases, it will be immediately clear whether there is a species-specific management regime in place (for example, if there is an annual TAC). In less clear circumstances, the rule of thumb should be that if the species meets the minimum requirements of clauses A1-A4, an adequate species-specific management regime is in place.

NOTE: If any species is categorised as Endangered or Critically Endangered on the IUCN Red List, or if it appears in the CITES appendices, it **cannot** be approved for use as an IFFO RS raw material. This applied to whole fish as well as by-products.

TYPE 1 SPECIES (Representing 95% of the catch or more)
Category A: Species-specific management regime in place.
Category B: No species-specific management regime in place.

TYPE 2 SPECIES (Representing 5% OF THE CATCH OR LESS)
Category C: Species-specific management regime in place.
Category D: No species-specific management regime in place.

Common name	Latin name	Stock	% of landings	Management	Category
Atlantic Wolffish	*Anarhichas lupus*	Northeast Artic Subareas 1,2	N/A	EU/Norway	D

CATEGORY D SPECIES

In a whole fish assessment, Category D species are those which make up less than 5% of landings and are not subject to a species-specific management regime. In the case of mixed trawl fisheries, Category D species may make up the majority of landings. In a by-product assessment, Category D species are those which are not subject to a species-specific management regime. In both cases, the comparative

lack of scientific information on the status of the population of the species means that a risk-assessment style approach must be taken.

The process for assessing Category D species involves the use of a Productivity-Susceptibility Analysis (PSA) to further subdivide the species into 'Critical Risk', 'Major Risk' and 'Minor Risk' groups. If there are no Category D species in the fishery under assessment, this section can be deleted.

Productivity and susceptibility ratings are calculated using a process derived from the APFIC document "Regional Guidelines for the Management of Tropical Trawl Fisheries, which in turn was derived from papers by Patrick *et al* (2009) and Hobday *et al* (2007). Table D1 should be completed for each Category D species as follows:

- Firstly, the best available information should be used to fill in values for each productivity and susceptibility attribute.
- Table D2 should be used to convert each attribute value into a score between 1 and 3.
- The average score for productivity attributes and the average for susceptibility attributes should be calculated.
- Table D3 should be used to determine whether the species is required to meet the requirements of Table D4. A species which does not need to meet the requirements of D4 is automatically awarded a pass.
- Table D4 should be used to assess those species indicated by Table D3 to determine a pass/fail rating.
- Any Category D species which has been categorised by the IUCN Red List as Endangered or Critically Endangered, or which appears in the CITES appendices, automatically results in a fail.

D1	Species Name:	Atlantic Wolffish *Anarhichas lupus*	
	Productivity Attribute	**Value**	**Score**
	Average age at maturity (years)	5.1	3
	Average maximum age (years)*	24	2
	Fecundity (eggs/spawning) *	>10,000	1
	Average maximum size (cm)*	150	2
	Average size at maturity (cm)*	54.1	2
	Reproductive strategy: Significant parental investment**	Clutch tenders	3
	Mean trophic level	3.6	3
	Average Productivity Score		**2.29**
	Susceptibility Attribute	**Value**	**Score**
	Overlap of adult species range with fishery	Not used	-
	Distribution (**Fig 2**)	25% - 50%	2
	Habitat: High overlap trawl gear	Demersal	3
	Depth range	Not used	-
	Selectivity	>x2 Mesh	3
	Post-capture mortality	Dead	3
	Average Susceptibility Score		**2.75**
	PSA Risk Rating (From Table D3)		**Table D4**

Evidence:

***** Life History Tool **R2**

****** Johannessen, T., J. Gjoseter and E. Moksness, 1993. Reproduction, spawning behaviour and captive breeding of the common wolffish *Anarhichas lupus* L. Aquaculture 115:41-51**.**

This assessment covers Subareas I, II (Artic Northeast) (**Figure 1**):

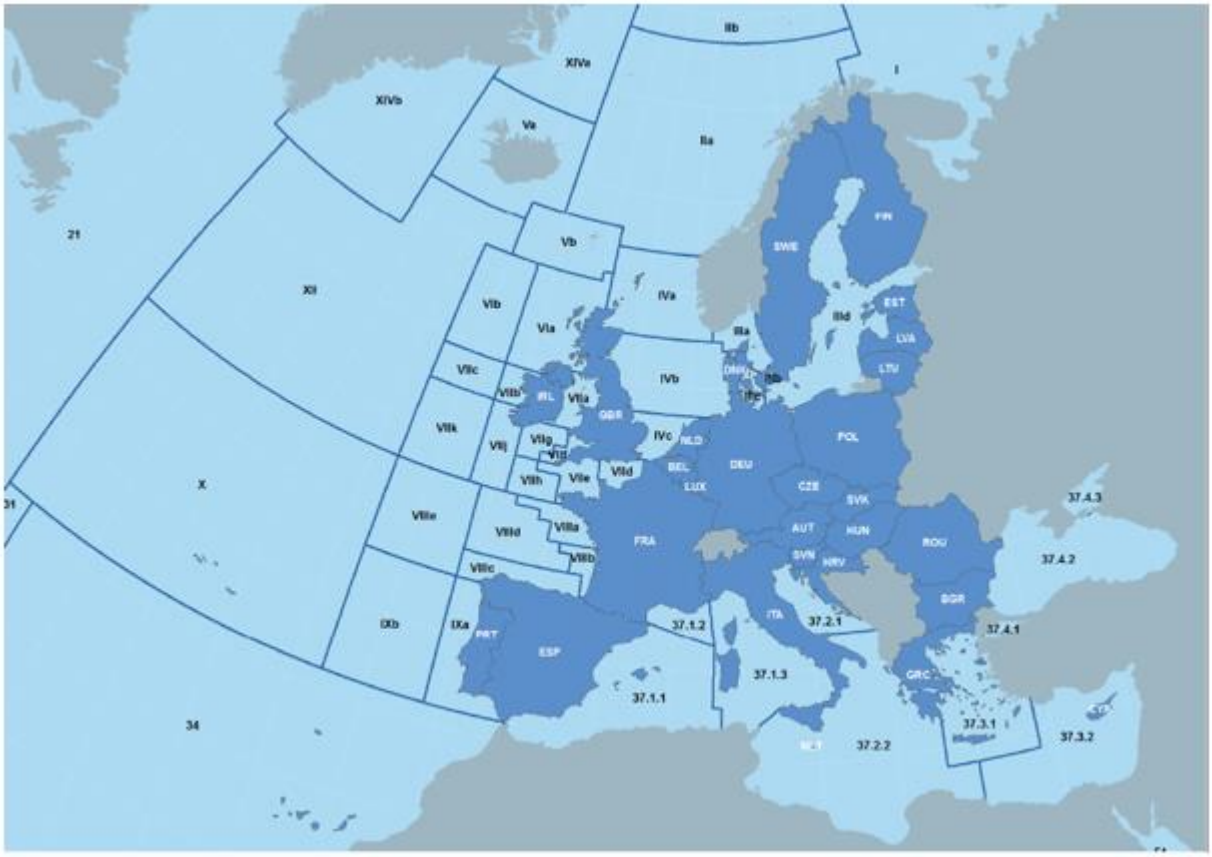

Figure 1 Map Sub-areas of FAO fishing areas 27 showing Subareas I and II (Northeast Artic) **R1**

Distribution:

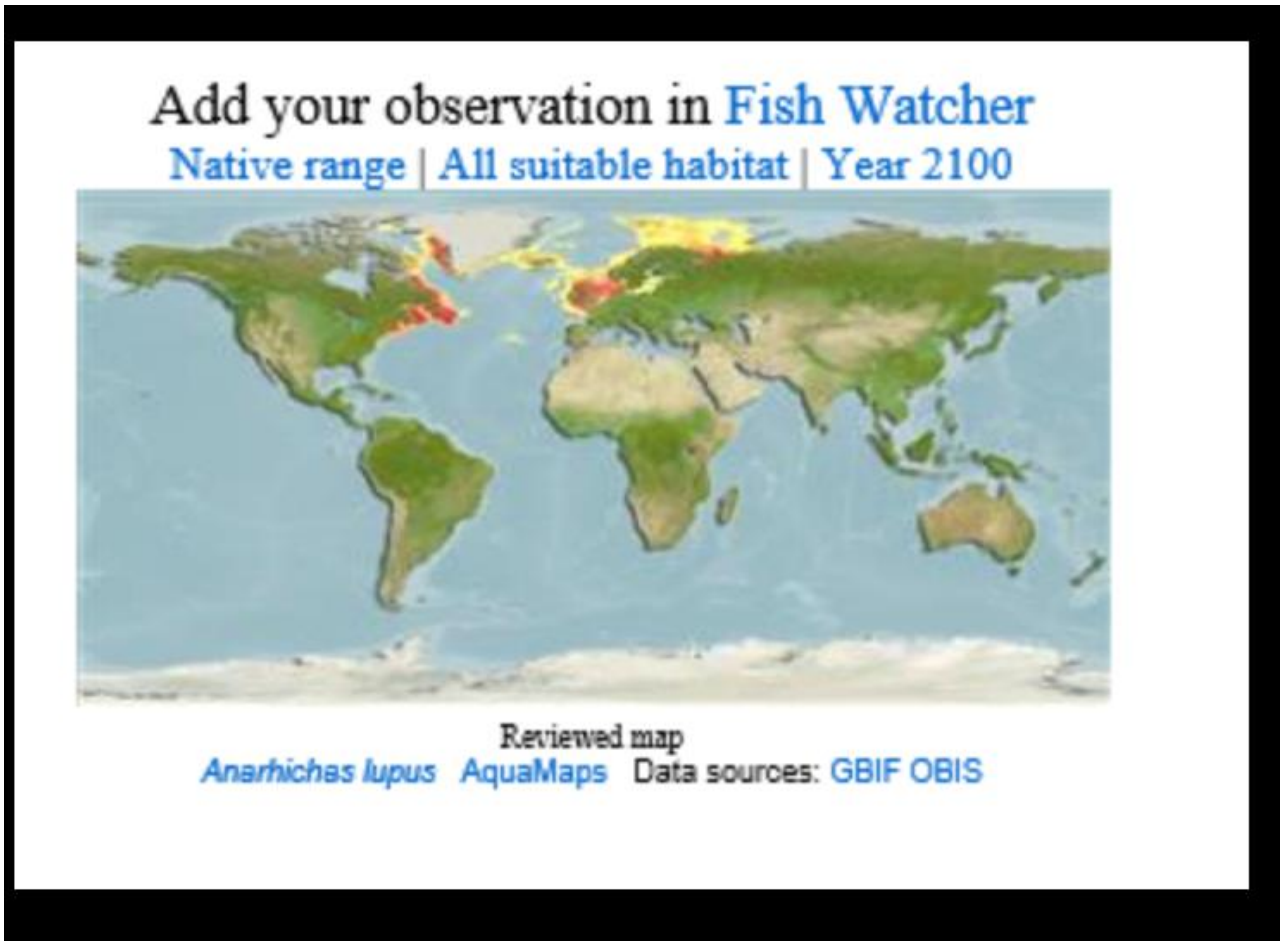

Figure 2: Atlantic wolfish distribution **R3**

Life History Data on *Anarhichas lupus*
Atlantic wolffish

Family:	Anarhichadidae Wolffishes	
Max. length (Lmax):	150.0 cm TL	
L infinity (Linf):	= 104.0 cm TL	Recalculate
K:	0.12 /year Ø' = 3.12 Median Ø' value with related Linf. and K.	Recalculate Growth & mortality data
to:	-1.02 years Estimated from Linf and K.	
Natural mortality (M):	0.16 s.e. 0.10 - 0.24 /year Estimated from Linf., K and annual mean temp. = 4.0 °C	Recalculate
Life span (approx.):	24.0 years Estimated from Linf., K and t_o. Max. age & size data	
Generation time:	8.8 years Estimated from Lopt, Linf., K and t_o.	
Age at first maturity (tm):	5.1 years Estimated from Lm, Linf., K and t_o.	
L maturity (Lm):	54.1 s.e. 40.4 - 72.5 cm TL Estimated from Linf. Maturity data	
L max. yield (Lopt):	72.0 s.e. n.a. - n.a. cm TL Estimated from Linf., K and M.	
Length-weight:	104.0 cm TL => 11799.3 g (wet weight) W = 0.0033 * L ^ 3.24900	Recalculate Length-weight data
Nitrogen & protein:	Weight (g) 11800 => whole-body nitrogen (N) 350.0 (g) => whole-body crude protein 2187.2 (g)	Recalculate
Reproductive guild:	guarders: clutch tenders Reproduction	
Fecundity:	[12,740-no value (max.)] Estimated as geometric mean.	Fecundity
Relative Yield per Recruit (Y'/R):	0.0522 Estimate Y'/R from M/K, Lc/Linf and E. Lc= 41.6 cm TL E= 0.50 /year Emsy 0.59 /year Eopt 0.54 /year Fmsy 0.23 /year Fopt 0.19 /year	Recalculate

Figure 3: Life history tool *A. lupus* **R3**

Standard clauses 1.3.2.2

Table D2 - Productivity / Susceptibility attributes and scores.

Productivity attributes	Low productivity/ High risk	Medium productivity/ Medium risk	High productivity/ Low risk
	Score 3	Score 2	Score 1
Average age at maturity (years)	>4	2 to 4	<2
Average maximum age (years)	>30	10 to 30	<10
Fecundity (eggs/spawning)	<1 000	1 000 to 10 000	>10 000
Average maximum size (cm)	>150	60 to 150	<60
Average size at maturity (cm)	>150	30 to 150	<30
Reproductive strategy	Live bearer, mouth brooder or significant parental investment	Demersal spawner "berried"	Broadcast spawner
Mean trophic level	>3.25	2.5–3.25	<2.5

Susceptibility attributes		High susceptibility/ High risk	Medium susceptibility/ Medium risk	Low susceptibility/ Low risk
		Score 3	Score 2	Score 1
Availability	1) Overlap of adult species range with fishery	>50% of stock occurs in the area fished	Between 25% and 50% of the stock occurs in the area fished	<25% of stock occurs in the area fished
	2) Distribution	Only in the country/ fishery	Limited range in the region	Throughout region/ global distribution
Encounterability	1) Habitat	Habitat preference of species make it highly likely to encounter trawl gear (e.g. demersal, muddy/sandy bottom)	Habitat preference of species make it moderately likely to encounter trawl gear (e.g. rocky bottom/reefs)	Depth or distribution of species make it unlikely to encounter trawl gear (e.g. epi-pelagic or meso-pelagic)
	2) Depth range	High overlap with trawl fishing gear (20 to 60 m depth)	Medium overlap with trawl fishing gear (10 to 20 m depth)	Low overlap with trawl fishing gear (0 to 10 m, >70 m depth)
Selectivity		Species >2 times mesh size or up to 4 m length	Species 1 to 2 times mesh size or 4 to 5 m length	Species <mesh size or >5 m length
Post capture mortality		Most dead or retained Trawl tow >3 hours	Alive after net hauled Trawl tow 0.5 to 3 hours	Released alive Trawl tow <0.5 hours

Note: Availability 2 is only used when there is no information for Availability 1; the most conservative score between Encounterability 1 and 2 is used.

D3		Average Susceptibility Score		
		1.00 – 1.75	1.76 – 2.24	2.25 – 3.00
Average Productivity Score	1.00 – 1.75	PASS	PASS	PASS
	1.76 – 2.24	PASS	PASS	TABLE D4
	2.25 – 3.00	PASS	TABLE D4	TABLE D4

D4	Species Name	Atlantic Wolffish Anarhichas *lupus*	
	Impacts On Species Categorised as Vulnerable by D1-D3 - Minimum Requirements		
	D4.1	The potential impacts of the fishery on this species are considered during the management process, and reasonable measures are taken to minimise these impacts.	**PASS**
	D4.2	There is no substantial evidence that the fishery has a significant negative impact on the species.	**PASS**
Outcome:			**PASS**

Evidence

D4.1:

Under the latest agreed record of consultations between Norway and the European Union fisheries arrangements for 2020 were outlined (**R4**):

Section 5 Paragraph 5.1 (Jointly managed stocks) of this agreed record referred to the wish of both Delegations to continue to work to avoid unwanted catches and discards through technical measures that improve selectivity, closed seasons and areas and other measures including a ban on high grading and Real Time Closure (RTC) systems. These measures, they conclude, would support both the EU landing obligation and discard ban in Norway.

Technical measures in force designed to reduce potential impacts of the fishery on this species include a minimum mesh size (130mm) for quota species, sorting grids that minimize catches of juveniles and move-on rules that protect juvenile target species (demersal stocks). Marine Protected Areas (MPAs) are also designed to protect vulnerable benthic habitats and species.

D4.2:

Fisheries are regulated in Norway, with restrictions on mesh size (gillnets), number of nets, and catching periods (**R4**). All commercial species caught in Norwegian and Russian waters must be retained, recorded and landed with the exception of juvenile Atlantic halibut (<80 cm) which shall be released alive in order to assist stock recovery.

A quantification of the degree of mixing and impact among species in the assessment area requires detailed information about target species (e.g. coastal cod, redfish) and mix per catch/landing and gear. Such data exist for some fleets (e.g. the trawler fleet).

A study was undertaken (**R5)** on the effect of targeted fisheries in the assessment area on Atlantic Wolffish and other minor species. The impact of these targeted fisheries on Atlantic Wolfish ranged from Medium to Low: (**Table 1**):

Table 1: Fleets and impacts on other species (Northeast Artic Subareas I,2) **R5**

Flexibility in coupling between the fisheries. Fleets and impact on the other species (H – high, M – medium, L – low, and 0 – nothing). The lower diagonal indicates which gears couple the species, and the strength of the coupling is given in the upper diagonal. The gears are abbreviated as: trawl roundfish (TR), trawl shrimp (TS), longline (LL), gillnet (GN), handline (HL), purse seine (PS), Danish seine (DS), and trawl pelagic (TP).

Species	Cod	Coastal cod	Haddock	Saithe	Wolffish	*S. mentella*	*S. marinus*	Greenland halibut	Capelin	Shrimp
Cod		H	H	H	M	M	M	M	L	M–H juvenile cod
Coastal cod	TR, PS, GN, LL, HL, DS		H	H	L	L	M-L	L	0-L	L
Haddock	TR, PS, GN, LL, HL, DS	TR, PS, GN,LL, HL, DS		H	M	M	M	L	0-L	M–H juvenile haddock
Saithe	TR, PS, GN, LL, HL, DS	TR, PS, GN,LL, HL, DS	TR, PS, GN, LL, HL, DS		L	L	M	0	0	0
Wolffish	TR, GN, LL, HL	TR,GN, LL, HL	TR, GN, LL, HL	TR, GN, LL, HL		M	M	M	0	M juvenile wolffish
S. mentella	TR	TR	TR	TR	TR		M	H	H juvenile *Sebastes*	H juvenile *Sebastes*
S. marinus	TR,GN, LL	TR,GN, LL	TR,GN, LL	TR,GN	TR, LL	TR		L	0	L–M juvenile *Sebastes*
Greenland halibut	TR, GN, LL,DS	TR,GN, LL	TR, GN, LL,DS	TR, GN, LL,DS	TR, LL	TR	TR		0	M–H juvenile
Capelin	TR, PS, TS, TP	PS, TP	TR, PS, TS, TP	PS	TP	TP	TP	None		L
Shrimp	TS	TS	TS	TS	TS	TS	TS	TS	TS	

These data can be used where fisheries are suspected of having significant interactions that deserve attention in setting up TACs applying to single stocks.

There is no substantial evidence that the fishery has a significant negative impact on the species.

References

R1: Map Sub-areas of FAO fishing areas 27 showing Subareas I and II R1 https://ec.europa.eu/fisheries/sites/fisheries/files/docs/body/fishing_areas_en.pdf

R2: McCusker, M.R. and Bentzen, P. 2010. Historical influences dominate the population genetic structure of a sedentary marine fish, Atlantic wolfish (Anarhichas lupus), across the North Atlantic Ocean, Molecular Ecology 19: 4228-4241 http://www.ncbi.nlm.nih.gov/pubmed/20819162

R3: Atlantic wolffish (Fishbase): https://www.fishbase.in/Summary/SpeciesSummary.php?ID=2501&AT=wolffish

R4: Agreed record of consultations between Norway and the European Union https://ec.europa.eu/fisheries/sites/fisheries/files/docs/body/2020-norway-fisheries-consultations-north-sea_en.pdf

R5 ICES Advice THE BARENTS SEA AND THE NORWEGIAN SEA 3.1 Ecosystem overview 19pp http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2007/may/Barents%20and%20Norwegian%20Seas.pdf

Standard clause 1.3.2.2