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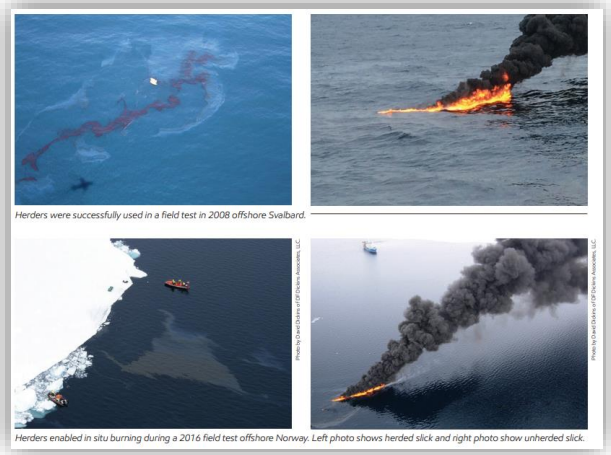
HERDERS – OSRL “UK APPROVAL PROJECT”

Dr Rob Holland, Technical Lead

Oil Spill Response

Herders

- Exploring new tools to add to the "*response toolbox*"
- What have OSRL done so far?
  - Explored stockpile supply, responder awareness training, storage, application options etc
  - Lead a **"Herder Working Group"** = OSROs, industry, supplier, researchers, regulators... Open invite to all!!
  - Attended Poker Flats 2023 on-water trials
  - Contracted a UK-based laboratory to screen Thickslick6535 against the new UK toxicity testing protocol
  - Regulatory approval process to have Thickslick 6535 on UK list of approved oil spill treatment products = another tool available for a NEBA-based decision
  - Stakeholder engagement in the UK – workshops etc



Centre for Environment Fisheries & Aquaculture Science

Cefas

World Class Science for the Marine and Freshwater Environment

Procedures for the testing and approval of oil spill treatment products

Final

Author(s): Helen E Walton, Paula Millikan & Mark F Kirby

Issue Date: 17th March 2020

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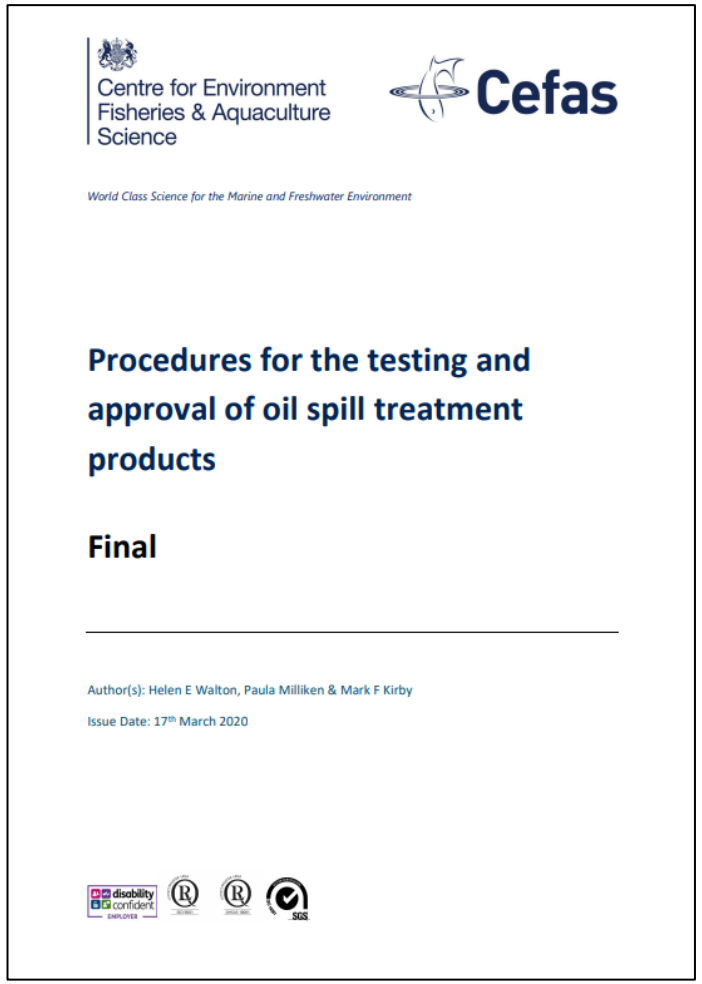
UK toxicity testing

- New UK Gov protocol released
  - Walton. H; Milliken. P & Kirby. M. (2020). *Procedures for the testing and approval of Oil spill treatment products. Centre for Environment Fisheries & Aquaculture Science (Cefas)*.
- Pass/fail LC_{50} @ 10ppm
  - *Tisbe battagliai* (a copepod)
  - *Skeletonema sp. (*a chain diatom)
- Strict requirements for testing



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Tox testing

- UK lab in Brixham, UK
- Work commissioned by OSRL
- Samples provided by DESMI
- All tests passed!
- Report used for MMO
- SETAC Europe 2022 poster

ThickSlick 6535: Determination of acute toxicity to the marine copepod *Tisbe battagliai* (Non-GLP)

Study Number: 1120.00203

1 SUMMARY

Sponsor	Dr Rob Holland, Oil Spill Response Ltd, Lower William Street, Southampton, SO14 5QE, UK
Test facility, location of raw data and final report	Scymaris Ltd., Brixham Laboratory, Freshwater Quarry, Brixham, Devon, TQ5 8BA, UK
Test substance	ThickSlick 6535
Subject	Determination of acute toxicity to the marine copepod *Tisbe battagliai*
Guideline	Procedures for the testing and approval of Oil spill treatment products (CEFAS, 2020) and ISO 14669:1999 guidelines
Test species	*Tisbe battagliai*, 6 ± 2 days old
Source of organisms	Continuous laboratory cultures at Scymaris
Test Loading rates (mg/L)	Control and WAF (Water Accommodate Fraction) loading rates of 57, 103, 185, 333 and 600mg/L
Length of test	48 hours, Static
Nominal test temperature	20 ± 2°C

Results based on nominal loading rates of ThickSlick 6535 (mg/L)

Time	LC50	95% CL
24 hours	688mg/L*	N.D
48 hours	447mg/L	356-631 mg/L

*extrapolated. N.D= not determined

Based on mortality compared to the control the 48 hour No Observed Effect Concentration (NOEC) was determined to be 103mg/L and the Lowest Observed Effect Concentration (LOEC) was 185 mg/L.

Thickslick 6535: Determination of acute toxicity to the marine alga, *Skeletonema costatum* (non-GLP)

Study Number: 1120.00201

1 SUMMARY

Sponsor	Oil Spill Response Ltd., Lower William Street, Southampton SO14 5QE, UK
Test facility, location of raw data and final report	Scymaris Ltd., Brixham Laboratory, Freshwater Quarry, Brixham, Devon, TQ5 8BA, UK
Test substance	ThickSlick 6535
Subject	Determination of acute toxicity to the marine alga, *Skeletonema costatum*.
Guideline followed	Procedures for the testing and approval of oil spill treatment products (Cefas)
Test species	Marine diatom *Skeletonema costatum*
Source of organisms	Scymaris laboratory culture from strain NIVA BAC1
Medium	Marine Algal Culture Medium MM5
Nominal Loading rates tested	Dilution water control (MM5) and nominal WAF (Water Accommodated Fraction) loading rates of 0.95, 3.05, 9.77, 31.25 and 100 mg/L
Length of test	72 hours
Nominal test temperature	20 ± 2°C

Results based on nominal loading rates of ThickSlick 6535

Based on fluorescence intensity at the end of the test, the results obtained were:

	ThickSlick 6535 (mg/L)	95% confidence limits (mg/L)
NOEC	0.95	-
LOEC	3.05	-
EC_{50}	25.2	11.3 – 47.7
EC_{20}	0.812	0.0123 – 4.41
EC_{10}	*	*

*The EC_{10} value for fluorescence intensity was not reported as the lower 95% confidence limit could not be determined, indicating this value is not reliable. For information only, the EC_{10} value calculated was 0.0863 mg/L.

Based on growth rate at the end of the test, the results obtained were:

	ThickSlick 6535 (mg/L)	95% confidence limits (mg/L)
NOEC	0.95	-
LOEC	3.05	-
E_rC_{50}	>100*	Not determined
E_rC_{20}	41.7	24.3 – 67.1
E_rC_{10}	4.19	1.38 – 9.67

*EC_{50} was above the highest loading rate tested

scymaris | Oil Spill Response

Assessing the Acute Toxicity of Herders to *Skeletonema sp* and *Tisbe battagliai* in Accordance with the UK Procedures for the Testing and Approval of Oil Spill Treatment Products

Tyler-Rose Woolley[1], Fern Lyne-Temple[1], Daniel Hill[1], Rob Holland[2]
[1] Scymaris Ltd., Brixham Laboratory, Freshwater Quarry, Brixham Devon TQ5 8BA UK, [2] Oil Spill Response Limited, United Kingdom

Introduction

A herding agent (or herder) is a chemical product containing a surface-active ingredient designed to reduce the surface tension of water and change how an insoluble liquid like crude oil spreads, causing oil slicks to rapidly thicken. Thicker oil slicks are more amenable to in-situ burning and are easier to recover by skimming. The use of a herder in a spill would always be guided by applied "Net Environmental Benefit Analysis" principles to ensure that no further harm is caused by the response technique (Ref 1). Herding agents can also be used to aid in the protection of sensitive resources e.g. saltmarshes. In this application, the herder is used to deflect oil away from these areas and reduce the impact risk. Herders are commercially ready for use; however, they require appropriate regulatory approvals before they can be considered for use in event of an oil spill.

Aims and Objectives

Based on assessments of products currently on the UK approved products list, the pass/fail criteria for the testing and approval of Oil Spill Treatment Products sets a threshold EC50 limit of >10 mg/L.
The acute toxicity of a herding agent to the marine alga *Skeletonema sp* and marine copepod *Tisbe battaglia*i was determined in accordance with the UK procedures for the testing and approval of Oil Spill Treatment Products (CEFAS, 2020) (Ref 2) to allow submission of the product to the MMO (Marine Management Organisation).

Figure 1 Effect on fluorescence intensity of the marine diatom *Skeletonema sp.* over 0 - 72 hours

Nominal Loading rate (mg/L)	Replicate	Fluorescence intensity 0 hours	24 hours	48 hours	72 hours	72 hour % inhibition compared to the control
Dilution water control	A	27	329	2984	17621	-
	B	30	310	2319	9594	
	C	29	285	2006	13092	
	D	32	390	2515	8719	
	E	25	283	1888	12836	
	F	32	312	2261	14610	
	Mean	**29**	**312**	**2346**	**12745**	
0.95	A	40	349	2417	12226	12
	B	41	371	2634	10681	
	C	33	331	2566	10798	
	Mean	**38**	**350**	**2539**	**11235**	

Methods

The *Skeletonema* test was run at a nominal temperature of 20±2°C for a duration of 72 hours. The test vessels were glass conical flasks closed with foam bungs. Containing 100 mL of test solution. Cell fluorescence was measured as a surrogate for algal biomass. Readings were taken at 24, 48 and 72 hours using a Tecan Infinite 200 pro Nano+ Microplate reader and the fluorescence intensity and growth rate were calculated for each loading rate. The loading rates employed were: Dilution water control (MM5) and nominal WAF (Water Accommodated Fraction) loading rates of 0.95, 3.05, 9.77, 31.25 and 100 mg/L.

The *Tisbe battagliai* test was run at a nominal temperature of 20±2°C for a duration of 48 hours. The test vessels were tissue culture wells with a working volume of 5mL within a 12-well plate, covered with loose fitting lids. *Tisbe* were assessed for mortality and symptoms of toxicity at 24 and 48 hours. The loading rates employed were: Dilution water control (seawater) and nominal WAF loading rates of 57, 103, 185, 333 and 600 mg/L.

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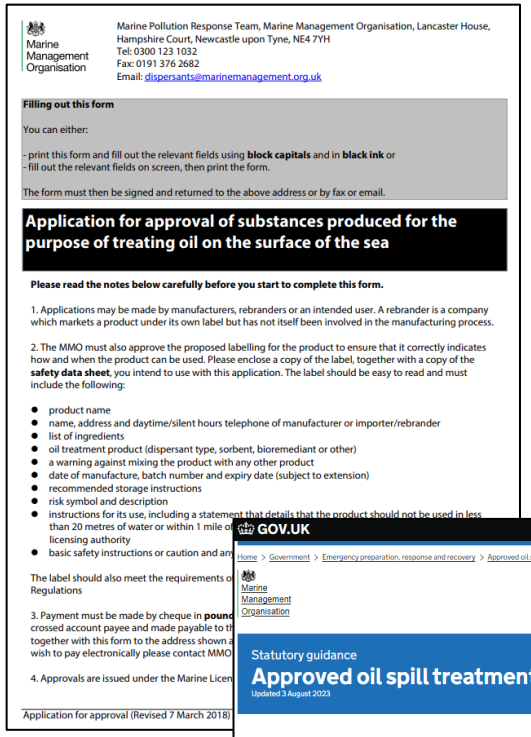
MMO approval process

- All new products submitted via MMO with a fee
- Supporting evidence required
- Notified by letter
- Thickslick6535 now on the UK Approved Oil Spill Treatment Products
  - https://www.gov.uk/government/publications/approved-oil-spill-treatment-products/approved-oil-spill-treatment-products



Marine Management Organisation

Marine Pollution Response Team, Marine Management Organisation, Lancaster House, Hampshire Court, Newcastle upon Tyne, NE4 7YH
Tel: 0300 123 1032
Fax: 0191 376 2682
Email: dispersants@marinemanagement.org.uk

Filling out this form

You can either:

- print this form and fill out the relevant fields using **block capitals** and in **black ink** or
- fill out the relevant fields on screen, then print the form.

The form must then be signed and returned to the above address or by fax or email.

Application for approval of substances produced for the purpose of treating oil on the surface of the sea

Please read the notes below carefully before you start to complete this form.

1. Applications may be made by manufacturers, rebranders or an intended user. A rebrander is a company which markets a product under its own label but has not itself been involved in the manufacturing process.

2. The MMO must also approve the proposed labelling for the product to ensure that it correctly indicates how and when the product can be used. Please enclose a copy of the label, together with a copy of the **safety data sheet**, you intend to use with this application. The label should be easy to read and must include the following:

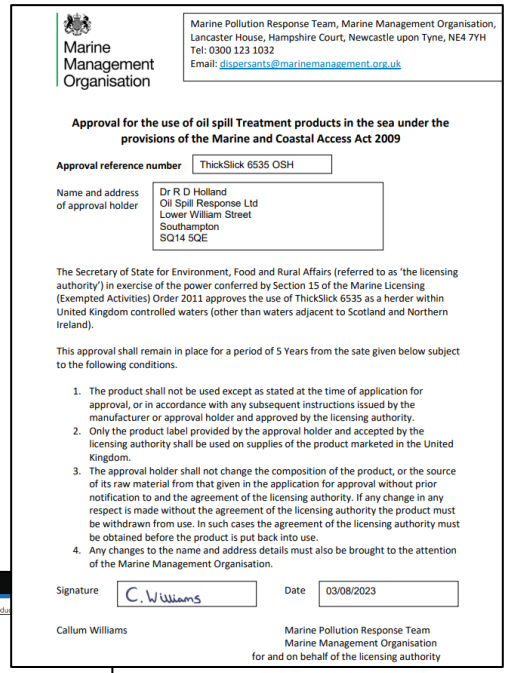
- product name
- name, address and daytime/silent hours telephone of manufacturer or importer/rebrander
- list of ingredients
- oil treatment product (dispersant type, sorbent, bioremediant or other)
- a warning against mixing the product with any other product
- date of manufacture, batch number and expiry date (subject to extension)
- recommended storage instructions
- risk symbol and description
- instructions for its use, including a statement that details that the product should not be used in less than 20 metres of water or within 1 mile of
- licensing authority
- basic safety instructions or caution and any

The label should also meet the requirements of
Regulations

3. Payment must be made by cheque in **pound**
crossed account payee and made payable to th
together with this form to the address shown a
wish to pay electronically please contact MMO

4. Approvals are issued under the Marine Licen

Application for approval (Revised 7 March 2018)



Marine Management Organisation

Marine Pollution Response Team, Marine Management Organisation, Lancaster House, Hampshire Court, Newcastle upon Tyne, NE4 7YH
Tel: 0300 123 1032
Email: dispersants@marinemanagement.org.uk

Approval for the use of oil spill Treatment products in the sea under the provisions of the Marine and Coastal Access Act 2009

Approval reference number ThickSlick 6535 OSH

Name and address of approval holder
Dr R D Holland
Oil Spill Response Ltd
Lower William Street
Southampton
SO14 5QE

The Secretary of State for Environment, Food and Rural Affairs (referred to as 'the licensing authority') in exercise of the power conferred by Section 15 of the Marine Licensing (Exempted Activities) Order 2011 approves the use of ThickSlick 6535 as a herder within United Kingdom controlled waters (other than waters adjacent to Scotland and Northern Ireland).

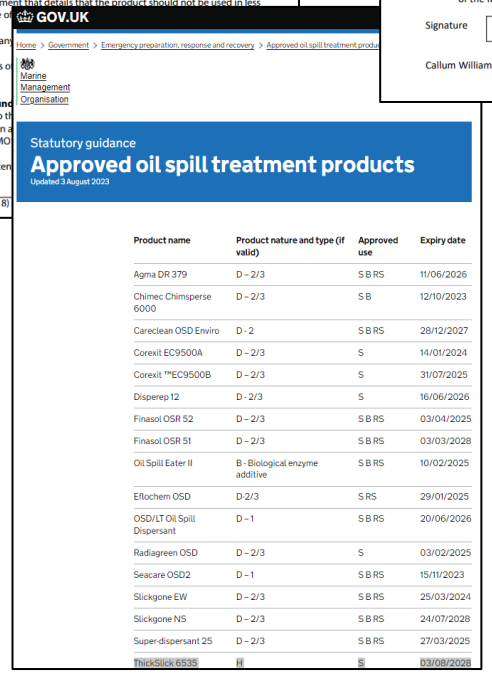
This approval shall remain in place for a period of 5 Years from the sate given below subject to the following conditions.

1. The product shall not be used except as stated at the time of application for approval, or in accordance with any subsequent instructions issued by the manufacturer or approval holder and approved by the licensing authority.
2. Only the product label provided by the approval holder and accepted by the licensing authority shall be used on supplies of the product marketed in the United Kingdom.
3. The approval holder shall not change the composition of the product, or the source of its raw material from that given in the application for approval without prior notification to and the agreement of the licensing authority. If any change in any respect is made without the agreement of the licensing authority the product must be withdrawn from use. In such cases the agreement of the licensing authority must be obtained before the product is put back into use.
4. Any changes to the name and address details must also be brought to the attention of the Marine Management Organisation.

Signature C. Williams Date 03/08/2023

Callum Williams

Marine Pollution Response Team
Marine Management Organisation
for and on behalf of the licensing authority



GOV.UK

Home > Government > Emergency preparation, response and recovery > Approved oil spill treatment produ

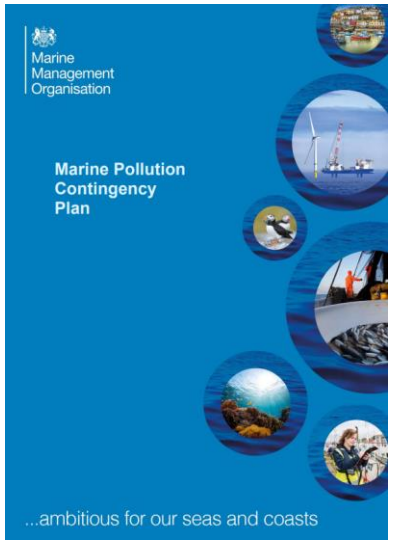
Marine Management Organisation

Statutory guidance

Approved oil spill treatment products

Updated 3 August 2023

Product name	Product nature and type (if valid)	Approved use	Expiry date
Agma DR 379	D – 2/3	S B RS	11/06/2026
Chimec Chimsperse 6000	D – 2/3	S B	12/10/2023
Careclean OSD Enviro	D - 2	S B RS	28/12/2027
Corexit EC9500A	D – 2/3	S	14/01/2024
Corexit ™EC9500B	D – 2/3	S	31/07/2025
Disperep 12	D - 2/3	S	16/06/2026
Finasol OSR 52	D – 2/3	S B RS	03/04/2025
Finasol OSR 51	D – 2/3	S B RS	03/03/2028
Oil Spill Eater II	B - Biological enzyme additive	S B RS	10/02/2025
Eflochem OSD	D-2/3	S RS	29/01/2025
OSD/LT Oil Spill Dispersant	D – 1	S B RS	20/06/2026
Radiagreen OSD	D – 2/3	S	03/02/2025
Seacare OSD2	D – 1	S B RS	15/11/2023
Slickgone EW	D – 2/3	S B RS	25/03/2024
Slickgone NS	D – 2/3	S B RS	24/07/2028
Super-dispersant 25	D – 2/3	S B RS	27/03/2025
ThickSlick 6535	H	S	03/08/2028



Marine Management Organisation

Marine Pollution Contingency Plan

...ambitious for our seas and coasts

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Next steps….

- Widen awareness across stakeholders e.g ITAC!
  - IOSC Alternative Paper accepted
- OSRL operational capability build = kit, training, procedures, stockpile procurement etc
- Continue Herder Working Group
  - Herder “Research Bank” e.g. Canada Gov (ECCC) efficacy testing support
  - Impact of Subpart J?
  - Exploring other countries e.g. France, Australia
- *Spill of opportunity?*
- *Oil on water exercise 2024/25?*

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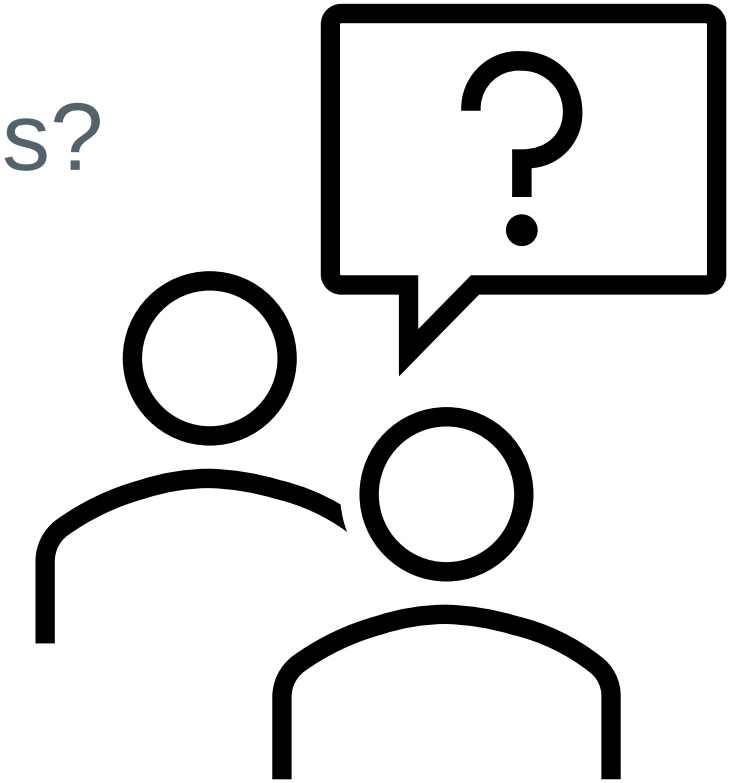
Questions?



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