Oil Spill Response

itac: Industry Technical Advisory Committee
for oil spill response

2021 Forum (virtual)

in cooperation with

Multi-Partner Research Initiative (MPRI)

November 2, 2021

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ITAC 2021 Forum Overview

Paul Schuler, Moderator
Director External Affairs, Americas
Oil Spill Response Limited

Membership

39 Participant members

And 117+ Associate Members

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Our Global Footprint

12 Locations Worldwide, 275 Employees

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Surface/Conventional Response

- Containment & Recovery
- In-situ Burning
- Dispersants & Application systems
- Shoreline Clean-up
- Wildlife Rehabilitation
- Surveillance & Modelling

Boeing 727 (2) & C130 Hercules Spray Aircraft

+ Global Dispersant Stockpile

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Subsea Well Intervention Services (SWIS)

Four Capping Stack Systems (CSS)
Two Subsea Incident Response Toolkit (SIRT)
Containment Toolkit
Offset Installation System (OIE)

- Available for the majority of **international** subsea wells
- Designed for subsea use up to **3000m water depth***
- Transportable by **road, sea and/or air***
- **Response Ready**

- Debris Clearance & Survey
- BOP intervention
- Subsea Dispersant Injection
- Capping'
- Containment & Flow
- Offset Installation Equipment

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Health & Safety Moment

Industry “Good Practice”

#1 Priority: Health & Safety of Responders

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ITAC Mission & Objectives (since 1996)

- Industry formed group
- Raise Awareness of OSPR Issues, Technological and Operational Developments, Research, Studies
- Exchange Information and Perspectives

- Build Collaborative/Communication Networks
- Communicate Industry "Good Practices"
- Inform Preparedness and Response

"Bridging Science and Response"

Recent ITAC Venues

2014 Tulane University, New Orleans

2015 CEDRE, Brest, France

2016 Woods Hole Oceanographic Institution,

2017 Plymouth Marine Laboratory, UK

2018 Nova Southeastern University, Florida

2019 National Oceanography Centre, UK

2020 *virtua*l mini ITAC-MPRI

2021 *virtual* mini ITAC-MPRI

2022 **hybrid* ITAC-MPRI, Halifax or Montreal

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Forum Objectives

- Assemble a diverse group of OSPR professionals:
  - Industry, Government, Academia, Responders, Stakeholders
- Present new S&T and operational information relating to oil spill response
- Identify high consequence issues that impinge on effective response
- Articulate industry positions on key international OSPR issues
  - Tiered Response, NEBA/SIMA, Response Toolbox,
  - Dispersants
  - Intelligence driven Response
- Integrate Surface response and Subsea Intervention
- Develop links between academia, response communities
- Promote realistic approaches to oil spill research.
- Encourage next generation professionals

Today's Topics

- Subsea Dispersant Injection (SSDI) and VOC Exposures to Surface Workers
- Subsea Mechanical Dispersion (SSMD)
- Wildlife Preparedness
- Field Dispersant Test Kit
- Plastic "Nurdle" Response, Sri Lanka

ITAC 2021 Forum Overview

Rob Holland, Ph.D.
Science Advisor
Oil Spill Response Limited

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Bridging Research to Response

- Outreach programme with academia to explain how the response "toolbox" feeds into NEBA/SIMA justifications and to highlight how research / technology have a role in future response tool development.
- We call this "*Bridging Research to Response*"
  - Spill response seminars and workshops to university classes
  - Track record of PhD inception, development, support and delivery at 2 UK institutes to date…
  - NERC engagement – Advisory Network and ARIES DTP Strategy Board

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University of Exeter, UK (2017-21)

- Ecotoxicology research group with internationally recognised expertise and facilities
- *"Critically evaluate whole organism and intracellular biomarkers sensitivity to environmentally relevant exposure concentrations of PAH, oil and dispersants in order to develop a suite of biomarkers able to rapidly assess oil toxicity in a spill scenario"*
- Scoped and funded using CONCAWE Biological Effects group (STF-32) = Shell, ExxonMobil, BP, Chevron...
- OSRL provided some funding and technical advice on spill response application to student, Miss Kat Colvin
- Two papers published to date = Colvin *et al.*, (2020); Colvin *et al.*, (2021)
- Kat Colvin now working for BP (UK

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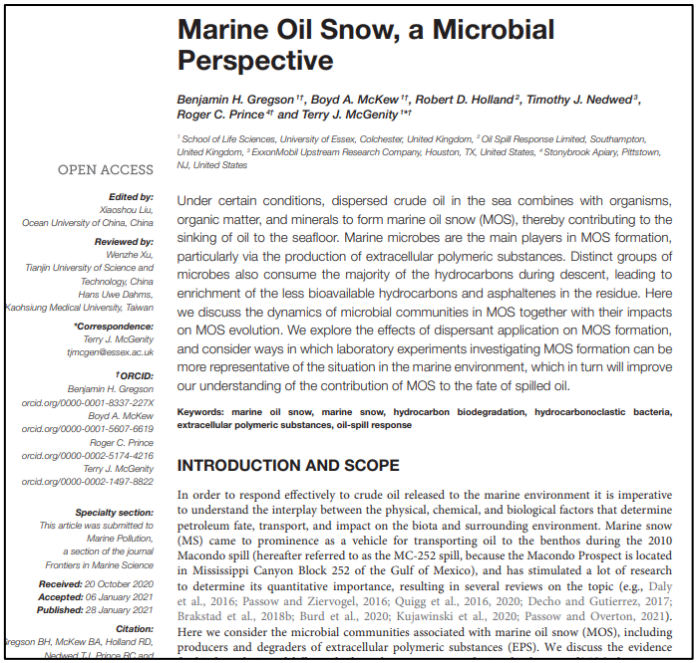
University of Essex, UK

- "*Marine Oil Snow*" – hot topic from GOMRI
- Generating varying opinions in research literature and NEBA/SIMA discussions
- Completed
  - Review paper published with an emphasis on the microbial community dynamics
- Current:
  - UK Gov funded PhD commenced
  - 4-year funding (2021-'25)
  - Industry advisory panel including OSRL, Shell & ExxonMobil
  - Oil biodegradation research expertise under Dr Boyd McKey and Prof Terry McGenity research groups



Marine Oil Snow, a Microbial Perspective

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Specialty section:
This article was submitted to Marine Pollution, a section of the journal Frontiers in Marine Science

Received: 20 October 2020
Accepted: 06 January 2021
Published: 28 January 2021

Citation:
Gregson BH, McKew BA, Holland RD, Nedwed TJ, Prince RC and

Under certain conditions, dispersed crude oil in the sea combines with organisms, organic matter, and minerals to form marine oil snow (MOS), thereby contributing to the sinking of oil to the seafloor. Marine microbes are the main players in MOS formation, particularly via the production of extracellular polymeric substances. Distinct groups of microbes also consume the majority of the hydrocarbons during descent, leading to enrichment of the less bioavailable hydrocarbons and asphaltenes in the residue. Here we discuss the dynamics of microbial communities in MOS together with their impacts on MOS evolution. We explore the effects of dispersant application on MOS formation, and consider ways in which laboratory experiments investigating MOS formation can be more representative of the situation in the marine environment, which in turn will improve our understanding of the contribution of MOS to the fate of spilled oil.

Keywords: marine oil snow, marine snow, hydrocarbon biodegradation, hydrocarbonoclastic bacteria, extracellular polymeric substances, oil-spill response

INTRODUCTION AND SCOPE

In order to respond effectively to crude oil released to the marine environment it is imperative to understand the interplay between the physical, chemical, and biological factors that determine petroleum fate, transport, and impact on the biota and surrounding environment. Marine snow (MS) came to prominence as a vehicle for transporting oil to the benthos during the 2010 Macondo spill (hereafter referred to as the MC-252 spill, because the Macondo Prospect is located in Mississippi Canyon Block 252 of the Gulf of Mexico), and has stimulated a lot of research to determine its quantitative importance, resulting in several reviews on the topic (e.g., Daly et al., 2016; Passow and Ziervogel, 2016; Quigg et al., 2016, 2020; Decho and Gutierrez, 2017; Brakstad et al., 2018b; Burd et al., 2020; Kujawinski et al., 2020; Passow and Overton, 2021). Here we consider the microbial communities associated with marine oil snow (MOS), including producers and degraders of extracellular polymeric substances (EPS). We discuss the evidence

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Presentations

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