• **We will illustrate the facts about dispersants and why they are an important oil spill response option.**

• **We want to work effectively with regulators and communities to minimize impact to people and the environment through the appropriate use of response options.**

• **We ask that regulators continue to develop new policies and support existing policies and plans that enable speedy response, critical resource sharing, and alignment on dispersant use.**
Our goal is to never have an oil spill, and the industry takes extensive precautions to prevent spills from occurring.
We follow a set of guiding principles that allows the response community to protect our shared values.
IT WILL CONTINUE TO BE AN IMPORTANT RESOURCE FOR DECADES TO COME.
Every second, approximately 18.85 tonnes of oil are being moved across the globe to power the world.

That’s over 1,625,000 tonnes every day.

More than 99.9999% of oil shipped via tanker arrives safely at its destination.
Our common enemy is the spread of spilled oil and its impact on our shared values — protecting them is a race against time.

The efficacy and speed of response are accelerated by:

- Sharing of objective information
- Pre-approving response tools
- Rapid, nonpartisan decision-making
- Mobilizing response capabilities
Response teams consider a variety of factors in making decisions prior to and during an oil spill.

**Environmental and Social Factors**

- Local Populations
- Sensitive Species
- Ecologically Sensitive Areas
- Local and Community Industries
- Cultural and Historical Considerations
- Recreational Activities
- Critical Infrastructure
- Seasonal Variables
# Our Response Toolbox

**We are prepared to respond to potential spill scenarios.**

<table>
<thead>
<tr>
<th>Example Scenarios</th>
<th>Possible Response Tools</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Offshore Release</strong></td>
<td></td>
</tr>
<tr>
<td>TANKER SPILL</td>
<td>SOURCE CONTROL</td>
</tr>
<tr>
<td><strong>Offshore Release</strong></td>
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<tr>
<td>SUBSEA SPILL</td>
<td>SOURCE CONTROL</td>
</tr>
<tr>
<td><strong>Offshore Release</strong></td>
<td></td>
</tr>
<tr>
<td>SPILL FLOWING TOWARDS POPULATED AREA</td>
<td>SOURCE CONTROL</td>
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<tr>
<td><strong>Near Shore Release</strong></td>
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<tr>
<td>SPAWNING SEASON</td>
<td>SOURCE CONTROL</td>
</tr>
<tr>
<td><strong>Onshore or Near Shore Release</strong></td>
<td></td>
</tr>
<tr>
<td>NEAR MARSH OR SAND BEACH</td>
<td>SOURCE CONTROL</td>
</tr>
</tbody>
</table>
**Why Dispersants?**

**Dispersants are used when environmental and spill factors limit the efficacy of other response options.**

**For offshore spills, dispersants can be transported and applied by airplane, and are therefore able to reach spills located further offshore faster.**

**Aerial application allows dispersants to reach a greater spill surface area than mechanical recovery, which can only be achieved by boat.**

**In the event of a subsea spill, dispersants can be applied proportionately and with minimal disruption, and can prevent most oil from reaching the surface.**

**Unlike mechanical recovery and in-situ burning, dispersants can be applied under a broader range of weather conditions, including high winds and rough seas.**
In larger, offshore oil spills, mechanical recovery and in-situ burning can only prevent a small percentage of the oil from impacting our shared values. Without the use of dispersants, oil often spreads to the shore, affecting people, the environment, and community assets.
**Dispensants break down oil in the environment and accelerate natural biodegradation processes.**

**Dispensants do...**
- Break down oil slicks into tiny droplets so that they can more easily be biodegraded

**Dispensants do not...**
- Drive oil to the sea floor
- Increase the toxicity of oil
- Minimize environmental and economic damage to people, habitats, and natural resources near and on the shoreline

**Dispensants do not...**
- Hide the problem instead of solving it
Dispersants work just like soaps and shampoos. They clean up spills by breaking oil slicks into tiny droplets — smaller than the diameter of a human hair. Dispersants are designed to work in the marine environment and prevent oil from re-coalescing.

The same ingredients in dispersants are also found in:

- Toothpaste
- Sunscreen
- Juice

Understanding the Composition of Dispersants
**How Do Dispersants Affect Oil?**

1. Dispersants can be applied by boat, plane, or subsea injection.

2. Dispersants reduce surface tension between oil and water so that oil slicks can break apart.

3. Dispersants are comprised of two parts.

4. Wave motion naturally breaks up oil. Dispersants enhance the separation process.

5. Tiny droplets remain neutrally suspended in the water column and are more readily available for biodegradation by microorganisms.

Microorganisms convert ingested oil into mostly carbon dioxide (CO₂) and water (H₂O).

*Source: National Academies Press, Understanding Oil Spill Dispersants: Efficacy and Effects*
Dispersants work in a similar fashion to the cake analogy above: oil is broken into tiny droplets that are more easily consumed by microorganisms.

"Dispersants don’t remove oil from the sea, but they are designed to help nature do so...Imagine a cake the size of a house, and a hundred thousand people trying to wolf it down at once; then imagine that cake cut into slices and passed around to the same crowd."

-The New Yorker, March 2011
**How Do Dispersants Affect Oil Toxicity?**

**Dispersants help to break apart the oil slick into tiny droplets that then biodegrade in the water column. This reduces the effects of oil toxicity to the marine environment.**

- **Dispersed droplets dilute in the water column**
- **Bacteria surround dispersed droplets**
- **Bacterial presence increases and rapid biodegradation occurs**
- **Biodegradation continues, eliminating oil toxicity**
- **Return to pre-spill use**

Time frame:
- **1-2 days**
- **4-6 weeks**
EXPERTS PERFORM LABORATORY TESTS TO DETERMINE THE EFFECT OF DISPERSANTS TO OIL TOXICITY LEVELS.

**V**ery Highly Toxic

**Highly Toxic**

**Moderately Toxic**

**Slightly Toxic**

**Practically Non-Toxic**

Additional sources: Environmental Protection Agency 2010

Additionally, studies conducted by the US Food and Drug Administration (FDA) and the National Oceanic and Atmospheric Administration (NOAA) have shown that, unlike mercury, ingestion of dispersed oil by marine organisms does not impact the food chain.
Members of government, industry, and academia test toxicity levels in dispersants before they are approved for use.

**How Do We Compare Toxicity?**

- **Very Highly Toxic**
- **Highly Toxic**
- **Moderately Toxic**
- **Slightly Toxic**
- **Practically Non-Toxic**

An Environment Canada study found dishwasher detergent to be 25-27 times more toxic than Corexit 9500.
A Net Environmental Benefit Analysis (NEBA) is conducted for spill response situations to minimize the impacts on people and the environment.

**Benefits**

- Reaches and treats significantly more oil than other response options
- Can be applied over a broader range of weather conditions
- Speeds up oil removal from the water column by enhancing natural biodegradation
- Prevents oil in a subsea spill from surfacing, mitigating harm to sea birds, mammals, and other wildlife
- Prevents oil from spreading to shoreline, reducing risk for sensitive shoreline vegetation and wildlife
- Reduces impact on community assets and local industries

**Drawbacks**

- Does not directly collect the oil from the environment, but rather transfers it from the surface to the water column where it can be biodegraded
- Potential effects of dispersed oil on water column-dwelling wildlife and vegetation (anticipate short-lived and localized exposures)
- Will not work on high viscosity fuel oils in calm, cold seas
- Has a limited “window of opportunity” for use
- Potential impact to fishing industries due to public misunderstanding of dispersants’ effects on seafood

Evaluating Our Response
Precautionary measures around dispersant application are taken to minimize possible human exposure.

- Low flying planes target specific locations for precise application.
- Dispersants are applied in a controlled and contained manner.
- Dispersant application occurs far from the shoreline at a sufficient depth.
- Subsea dispersant application minimizes direct human contact with dispersants, oil, and volatile fumes.
Industry and government organizations are currently sponsoring projects to study further the fate and effects of oil in subsea and arctic environments.

To support the dispersant pre-approval and response decision-making processes, regulators have developed guidance for dispersant selection and post-spill monitoring.

Industry is evaluating new tools to monitor and detect oil, including tools that detect oil at night and in the deep sea. This will support better, more informed response decision-making.

Scientists are working to develop dispersants that are even more environmentally friendly and efficient.
Many countries consider dispersants an important tool in oil spill response. However, there are global differences in the types of approved dispersants and how and when to use them.
Industry has developed plans in support of government policies to guide dispersant use during oil spill response.

Speed is critical in oil spill response, and pre-approvals in government policies greatly aid in this.

In areas where pre-approvals do not exist, efficient and rapid decision-making is especially important.
Our shared goal is to preserve human life, the environment, and community well-being during oil spill response.

How can you be a part of this goal?

**Learn**

The facts about oil spill response and evaluate the role of dispersants.

**Understand**

The value of dispersants and when and where they should be applied.

**Support**

Policies and plans that promote rapid and effective decision-making in oil spill response.
THE GOAL OF OIL SPILL RESPONSE IS TO MINIMIZE IMPACT TO PEOPLE, ENVIRONMENTS, AND THE COMMUNITY AND ENABLE THE MOST RAPID RECOVERY.

THE DECISION TO USE DISPERSANTS IS A CHOICE MADE AFTER CAREFUL EVALUATION OF THE FACTORS, WITH A CLEAR UNDERSTANDING OF THE POSSIBLE TRADE-OFFS.

DISPERSANTS ARE USED IN SPECIFIC SPILL SCENARIOS WHERE THEY ARE THE MOST EFFECTIVE TOOL, SUCH AS LARGER, OFFSHORE SPILLS.

DISPERSANTS BREAK DOWN OIL IN THE ENVIRONMENT BY CREATING SMALLER DROPLETS OF OIL THAT DILUTE IN THE WATER COLUMN, WHICH ARE THEN BIODEGRADED.

THE APPLICATION OF DISPERSANTS DOES NOT INCREASE THE TOXICITY OF OIL; COMPONENTS OF DISPERSANTS ARE FOUND IN COMMON HOUSEHOLD PRODUCTS.

DISPERSANTS ARE APPLIED FAR FROM PEOPLE, WITH HUMAN HEALTH AND SAFETY AS THE FIRST PRIORITY.

GOVERNMENTS AND INDUSTRY MUST PLAN AHEAD IN ORDER TO ACT WITH SPEED AND ALIGNMENT AND TO MAKE DISPERSANT-USE DECISIONS DURING SPILL EVENTS.
APPENDIX
## Our Response Toolbox

### When a Spill Occurs, Source Control is Immediately Applied — After Which, Response Tools are Implemented.

<table>
<thead>
<tr>
<th>Response Toolbox</th>
<th>Benefits</th>
<th>Drawbacks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dispersants</strong></td>
<td>• High aerial coverage rate possible at the water surface</td>
<td>• Special approvals required</td>
</tr>
<tr>
<td></td>
<td>• High treatment efficiency possible subsea</td>
<td>• Less known about long term effects of subsea use</td>
</tr>
<tr>
<td></td>
<td>• Large volumes of oil can be treated</td>
<td>• Perceived to be unsuitable for calm seas</td>
</tr>
<tr>
<td></td>
<td>• Potentially high oil elimination rate</td>
<td>• Short-term, localized reduction in water quality</td>
</tr>
<tr>
<td></td>
<td>• Reduced vapors at the water surface; improves safety</td>
<td>• Potential impact on water column ecology</td>
</tr>
<tr>
<td></td>
<td>• No recovered oil storage requirements</td>
<td>• Specialized equipment and expertise required</td>
</tr>
<tr>
<td></td>
<td>• Lower manpower requirements</td>
<td>• Usage near shore in shallow water could result in greater water column impacts</td>
</tr>
<tr>
<td></td>
<td>• Potentially the quickest response option</td>
<td>• Will not work on high viscosity fuel oils in calm, cold seas</td>
</tr>
<tr>
<td></td>
<td>• Prevents oil from spreading to shoreline</td>
<td>• Has a limited “window of opportunity” for use</td>
</tr>
<tr>
<td></td>
<td>• Useful in higher wind and sea conditions</td>
<td>• Inefficient and impractical on thin slicks</td>
</tr>
<tr>
<td></td>
<td>• Effective over wide range of oil types and conditions</td>
<td>• Ineffective in inclement weather or high seas</td>
</tr>
<tr>
<td><strong>Mechanical Recovery</strong></td>
<td>• Well-accepted, no special approvals needed</td>
<td>• Requires storage capability</td>
</tr>
<tr>
<td></td>
<td>• Effective for recovery over wide range of spilled products</td>
<td>• Typically recovers no more than 10-20 percent of the oil spilled</td>
</tr>
<tr>
<td></td>
<td>• Large “window of opportunity”</td>
<td>• Labor- and equipment-intensive</td>
</tr>
<tr>
<td></td>
<td>• Minimal side effects</td>
<td>• Special approvals required</td>
</tr>
<tr>
<td></td>
<td>• Greatest availability of equipment and expertise</td>
<td>• Ineffective in inclement weather or high seas</td>
</tr>
<tr>
<td></td>
<td>• Recovered product may be reprocessed</td>
<td>• Black smoke perceived as significant impact on people and the atmosphere</td>
</tr>
<tr>
<td><strong>In-Situ Burning</strong></td>
<td>• High oil elimination rate possible</td>
<td>• Localized reduction of air quality</td>
</tr>
<tr>
<td></td>
<td>• No recovered oil storage requirements (except possibly for burn residue)</td>
<td>• Specialized equipment and expertise required</td>
</tr>
<tr>
<td></td>
<td>• Effective over wide range of oil types and conditions</td>
<td>• Potential for secondary fires during inland use</td>
</tr>
<tr>
<td></td>
<td>• Specialized equipment (boom) is air transportable</td>
<td>• Burn residue can be difficult to recover</td>
</tr>
<tr>
<td><strong>Physical Removal</strong></td>
<td>• Non-aggressive methods can have minimal impact on shore structure and shore organisms</td>
<td>• Aggressive removal methods may impact shoreline and shore organisms (e.g., sand removal and cleaning)</td>
</tr>
<tr>
<td></td>
<td>• Useful for detailed cleaning of near shore environment in specific or sensitive areas</td>
<td>• Potential for heavy equipment and high foot traffic (trampling) can cause additional environmental damage</td>
</tr>
<tr>
<td><strong>Natural Processes</strong></td>
<td>• No intrusive removal or cleanup techniques that further damage the environment</td>
<td>• Removal occurs after oil has already impacted shore</td>
</tr>
<tr>
<td></td>
<td>• Complements other response techniques</td>
<td>• Labor-intensive</td>
</tr>
<tr>
<td></td>
<td>• May be best option if there is little to no threat to human or environmental well-being</td>
<td>• Winds and currents can change, sending the oil spill toward sensitive areas</td>
</tr>
<tr>
<td></td>
<td>• When selected for certain areas and conditions, the environment can recover from the spill more effectively than it might when using other response tools</td>
<td>• Residual oil can impact shoreline ecology, wildlife, and economically relevant resources</td>
</tr>
</tbody>
</table>

Dispersants allow small oil droplets to form which speed up natural breakdown in the water column.

Mechanical recovery uses booms and skimmers to contain and remove oil from the water surface.

In-situ burning involves igniting contained oil slicks.

Physical removal consists of the physical removal of surface oil by crews with tools and machinery.

Natural removal allows for more effective recovery in environments where intervention would be detrimental.
WHERE DOES OIL COME FROM?

Crude oil is a naturally occurring substance that is found in many places, including below the ocean floor.

1. The oil and gas we use today began as microscopic plants and animals living in the ocean millions of years ago.

2. When the plants and animals died, they sank to the bottom of the sea.

3. Heat and pressure transformed the remains into oil or natural gas.

4. Oil and natural gas tend to migrate through tiny pores in the surrounding rock, causing natural seeps.

Nature takes care of oil every day through biodegradation.

Source: ADVENTURESINENERGY.COM
About 15% of oil released into the environment comes from the oil industry, and it is working every day to reduce spill risk and develop innovative response solutions.

Additional information on dispersants and other tools in the oil spill response toolbox is available at:

www.oilspillprevention.org

or

http://oilspillresponseproject.org