Acquisition Directorate

Research & Development Center

Oil-in-Ice Response Project

November 18, 2010

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Outline

- Great Lakes Restoration Initiative (GLRI)
- Great Lakes oil-in-ice issues
- In-Situ Burning (ISB) –
  lessons learned from ISB development
- Anchorage Workshop
- Cleveland Workshop
- Future

Great Lakes Restoration Initiative (GLRI)
http://www.epa.gov/glnpo/glri/

Environmental Protection Agency-led, interagency Great Lakes restoration initiative, which will target the most significant problems in the region, including invasive aquatic species, non-point source pollution, and contaminated sediment

- Aquatic Nuisance Species
- Submerged Oil
- Oil in Ice

Continuing Resolution and changing Congress puts this funding in jeopardy

Great Lakes Oil-in-Ice Issues

- **Spills originating on land,**
  - Outfalls
  - Train/truck crashes
- **Pipelines**
- **Older vessels**
- **Future issues due to climate change**
  - Reduced water levels (?)
  - Push out shoulder seasons (?)
- **Great Lakes Response**
  - Primarily mechanical response
  - In-situ Burn in plans
  - No freshwater dispersants
  - Logistics support limited

Oil-in-ice Response

- **Arctic research started back in late 1960s early 1970s**
- **Many other projects in US, Canada and International**
  - Some intentional spills
- **Multiple summaries / state-of-the-art papers since 2000**
  - Caught most of previous research
    - Latest Joint Industry Project (JIP) planned to start Jan 2011
  - Developed in guides including but not limited to:
    - EPPR from Arctic Council
    - STAR from State of Alaska
    - Alaska Clean Seas
    - Environment Canada Shoreline Protection
- **Multiple Research Efforts by US and International industry and organizations**

Gulf of Mexico ISB Experience

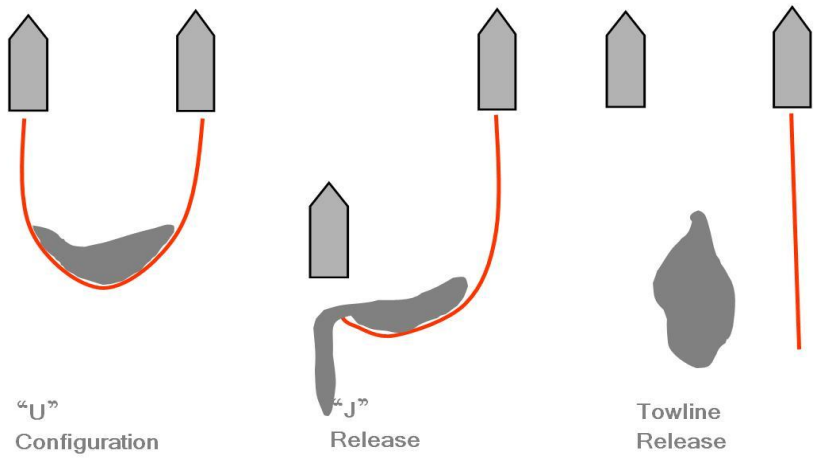
- **By early 1990s some ISB techniques had been developed**
- **Questions concerning equipment and feasibility still existed**
  - Lack of ISB Equipment
  - Lack of Trained Personnel
  - Lack of Detailed Op Plan
  - Confusion about Cost & Benefits
- **Development into Tool**
  - Equipment – multiple agencies embarked on standards development through ASTM
  - Techniques – Individual methods had been tested and evaluated but limited full-scale implementations
  - RDC worked with experts and industry for series of exercises

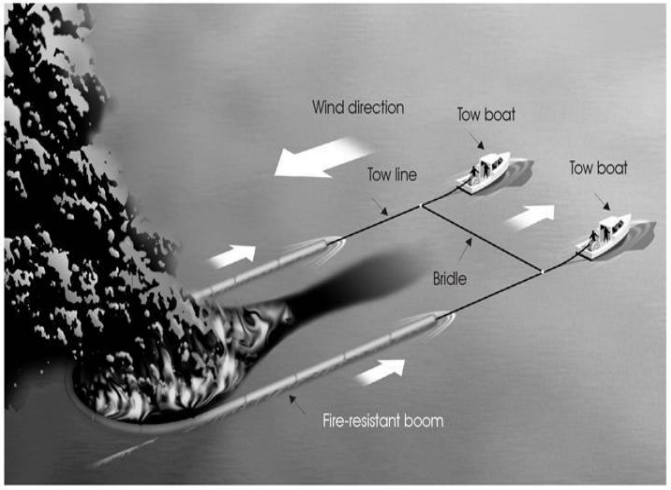
Galveston Exercises

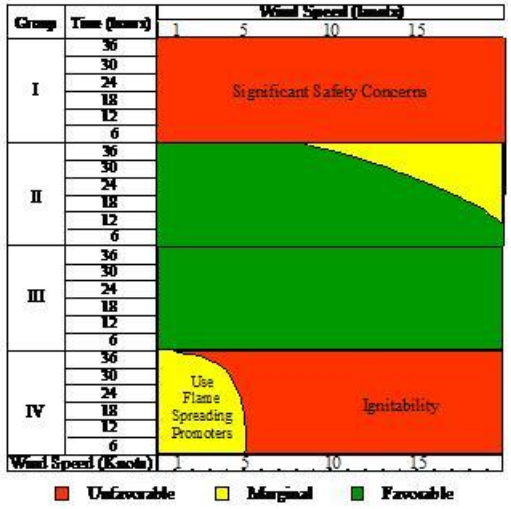
- **Progressive Approach**
  - April 1999 – ISB Vessel OPS
  - November 1999 - Vessel OPS plus Helo Torch
  - September 2000 – Full ISB/ICS Rehearsal

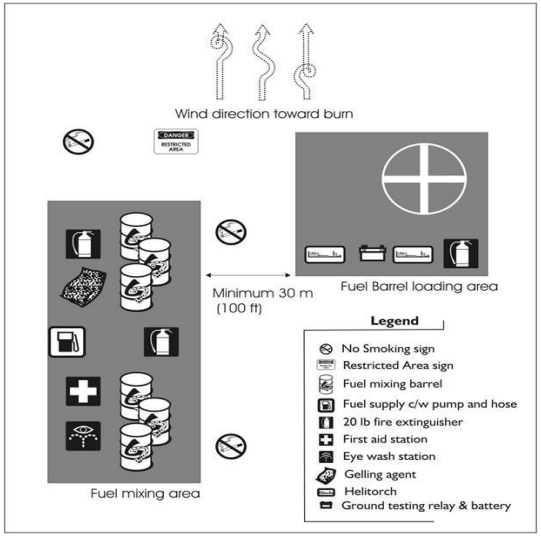
Result – ISB Offshore Operations Manual

- **Decision Guide**
- **Operating Procedures**
- **Reference Materials**









Alaska Workshop – April 23, 2010

- **Detection**
  - Use of autonomous underwater vehicles (AUV)
  - Use on unmanned aerial vehicles (UAV)
  - Evaluate IR and radar (need oil)
  - Ice mapping/tracking using satellites and buoys
  - Dog sniffers (need oil)
- **Mitigation of Oil on the Water**
  - Test oil surrogates
  - Evaluate booms
  - Ice Management issues with icebreakers/ice strengthened vessels
  - Test dispersant equipment with dye/water
  - Response platforms evaluation in multiple conditions
  - Evaluate self-propelled skimmer
- **Shoreline Cleanup**
  - Evaluate shoreline contamination assessment team (SCAT)Equipment
  - Other techniques like surf washing and trenching

Great Lakes Workshop – August 25, 2010

- **Oil Containment in Brash Ice**
  - Use ice management to corral oil
  - Use detection techniques to identify area (Ground penetrating radar, AUV, etc.
- **Oil Detection In and Under Ice**
  - Use of dogs (need to intentionally spill oil or Ohmsett)
- **Demonstrate existing capabilities**
  - Use CG and OSRO equipment
- **Training and Knowledge**
  - Consider table-top to help develop more realistic contingency plans.

What can we bring to Great Lakes for oil-in-ice response?

Develop a plan that steps through increasingly challenging exercises…workshop is one input into that plan.

First Exercise Options

- **Tabletop or Existing Equipment Demonstration**
- **Icebreaker Deployment**
  - Ice management
  - Equipment deployment
- **Scenario Locations**
  - Detroit/St Clair
  - St Mary's
  - Lake Superior/Michigan
- **Physical Locations**
  - Detroit
  - Cleveland
  - Chicago
  - Madison/Milwaukee
  - Sault Ste Marie, MI
  - Next RRT location?

Next Steps

Exercise in beginning of season December 2011

Exercise in December 2012 or March 2013

Establish working group for manual development

Potential Results (dependent upon funding)

- **Decision Guide – specific for Great Lakes**
- **Operating Procedures – use other information**
- **Reference Materials – use other information**

DISCUSSION

Extra Slides

Alaska Workshop Mitigation

	To be Performed in the Great Lakes	To be Performed in Alaska
Without oil	• Determine operational limitations of fireproof and/or ice-strengthened conventional booms • Testing concept of open apex • Provide experience for spill responders • Vessel based ice management (rivers and open water) using a z-drive ice breaker or other ice vessels • Ice management using ice deflection booms, barges, tow boats and other ice-strengthened vessels • Exercise existing methodologies to deploy dispersants (SINTEF articulating arm, spray booms, helicopter, fixed- wing, new gel-based dispersant equipment, fire monitors, deflection boom, APEX dispersion) • Test response platforms for use in over flood and/or rotting ice conditions (e.g., ARCTOS, airboats, hovercraft) • Test fixed-wing ignition after experimentation phase completed • Evaluate self-propelled skimmer after experimental phase	• Determine operational limitations of fireproof and/or ice strengthened conventional booms • Testing concept of open apex • Provide experience for spill responders • Evaluate ice management technique using ice deflection booms, barges, tow boats and other ice-strengthened vessels • Exercise existing methodologies to deploy dispersants (SINTEF articulating arm, spray booms, helicopter, fixed-wing, new gel-based dispersant equipment, fire monitors, deflection boom, APEX dispersion). • Test response platforms for use in over flood and/or rotting ice conditions (e.g., ARCTOS, airboats, hovercraft) • Test fixed-wing ignition after experimentation phase completed
With oil	• Determine operational limitations of fireproof and/or ice-strengthened conventional booms • Test concept of open apex • Provide experience for spill responders	• Determine operational limitations of fireproof and/or ice-strengthened conventional booms • Test concept of open apex • Provide experience for spill responders • Evaluate Fuzzy Disc skimmers and grooved drum skimmers (and possible other devices) after experimental phase

Alaska Workshop Detection

	Performed in the Great Lakes	Performed in Alaska
Without oil	• Test logistics of autonomous underwater vehicle (AUV) technology with different sensors • Test cross-boundary equipment agreements	• Test aerial unmanned vehicles (permitting, logistics, sensors, data transmission) • Demonstrate shipboard infrared (IR) and radar for detecting a target • Use over flights to update NOAA manuals • Test cross-boundary equipment agreements • Evaluate synthetic aperture radar (SAR) satellite tracking
With oil	• Test dogs' abilities at sniffing oil under ice (could be done in any freshwater). Start at a minimum depth of 2 ft and increasing smell sensitivity to 6 ft	• Test dogs' abilities at sniffing oil under ice • Demonstrate shipboard IR and radar for detecting a target • Evaluate ice tracking buoys

Alaska Workshop Shoreline

	Performed in the Great Lakes	Performed in Alaska
Without oil	• Test assembling, outfitting, mobilizing, safety, communications plan, and equipping SCAT teams • Evaluate surf washing (clay/oil flocculation and/or oil-mineral aggregates (OMA)) • Evaluate shoreline trenching	• Assembling, outfitting, mobilizing, safety, communications, plan, equip SCAT teams • Evaluate surf washing (clay/oil flocculation and/or OMA)
With oil	• Evaluate surf washing (clay/oil flocculation and/or OMA)	• Evaluate surf washing (clay/oil flocculation and/or OMA)

GL Workshop 1

Mitigation and Shoreline response

- Lack of adequate plans
- Lack of training
- Consider no response

GL Workshop 2

Detection and Tracking

- Need remote detection techniques for initial detection and also strategic monitoring (IR or dogs)
- Need plans to be updated with snow/ice scenarios
- OSROs still have logistics issues in ice (access and deployment
- Need oil/ice tracking capability (e.g. buoys, AUVs)
- Gap in modeling capabilities
- Training and response manuals issues