Arctic Council

Guidelines for Transfer of Refined Oil and Oil Products in Arctic Waters (TROOP)

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PAME
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PURPOSE OF THE GUIDELINES

These guidelines are written for vessels that may be supplying Arctic communities, industries, and other vessels working in the Arctic. The aim of these guidelines is to prevent cargo/fuel oil spillage, and the resulting environmental damage, during transfer between any two vessels or between a vessel and shore facility, in either direction.

Although they have been written for Arctic waters the use of these Guidelines, is encouraged in all ice-invested waters.

Due to limitations in spill response in ice-filled waters or extremely cold conditions, all transfers should be treated with caution. This guide is designed to address the most common requirements for oil transfer. However, because of the inefficiency of the response technologies in ice-filled waters, transfers from vessel-to-vessel will require greater caution under extreme conditions.

Operations at any terminal, are to be conducted by tankers in accordance with the recommendations of the *International Safety Guide for Oil Tankers and Terminals (ISGOTT).*

Cargo/fuel oil spillage can be prevented by:

- The safe transfer of oil cargo or fuel using sound, well rehearsed practices, adequate numbers of trained and alert personnel, sufficient materials, and well maintained thoroughly tested equipment.
- Compiling and exercising contingency and emergency plans regularly, to familiarize all personnel involved with the essential needs and hazards of such operations.
- Prompt and correct local response in the event of a spill to safeguard life and property; and to lessen the environmental impact.
- Prompt and accurate reporting of oil spills, to enable responsible authorities to mobilize resources and take appropriate measures, if required, to lessen the impact of such an event.

In summary, transfer supervisors and their crews must be able to work safely and carefully, secure in the knowledge that reasonable precautions have been taken, and that adequate resources can be deployed if an unforseen problem develops.

VESSELS AND SHORE FACILITIES

Any vessel engaged in oil transportation, transfer or storage in the Arctic should be:

- Designed, constructed, and suitably equipped for the task and conditions;
- Operated by competent qualified persons;

When transfers are carried out they should:

- Be carefully checked and supervised; and
- Receive or discharge oil only from shore facilities or vessels that are safe, and that comply with applicable regulations and standards.

General Principles

When carrying out oil transfers the following general principles should be recognized:

While the agent responsible for spill control and response, may be governed by local or national provisions, the polluter will be held responsible for any liability and costs ensuing from failure to contain product.

No discharge of any oil, oily water or any other liquids or substances that may cause pollution or discoloration of the water, whether oily or not, are allowed as a result of transfer operations.

In all transfers the primary consideration shall be protection of human life and safety, the secondary consideration shall be the avoidance of any discharge whatsoever, and the third consideration shall be protection of the vessel and equipment.

Effective transfers occur only when all parties to the transfer understand their roles and responsibilities and communicate them clearly in advance of the transfer, during the transfer and upon completion of the transfer.

In all transfers, each party has the right to suspend operations at any time; if they decide it is necessary.

PRE-TRANSFER PREPARATION

Notification of Local Authorities

Persons in charge of supplier and recipient vessels or facilities, should:

- Inform local authorities as appropriate;
- Where local traffic warrants and if the transfer location is outside "port" facilities areas, broadcast navigational warnings on VHF before starting, announcing the name(s) of vessel(s), the geographic location, the nature and expected duration, and requesting a wide berth;
- Cancel the warning when transfer operations are complete and secured.

Pre Transfer Briefing

A pre-transfer briefing between transfer supervisors of the supplier and recipient vessel(s)/facilities should be held to ensure all parties understand:

- their duties and responsibilities during the transfer, and to confirm they are versed in emergency procedures, and know the oil spill contingency plan to be followed in the event of an incident.
- the dimensions of the other's key facilities, such as manifold/fuelling station location, maximum and minimum draught, barge/ship length, fendering arrangements, shore manifold connections, and jetty/shore characteristics such as tides, bollards, mooring and positioning aids, hidden hazards

As part of the pre transfer briefing process the use of a check list is suggested (Appendix B).

It is important that all parties involved in the transfer are aware of the various actions required during the operation.

Establish Environmental Conditions Required

The most recent forecasted environmental conditions faced by the shore facility and vessel during the period of transfer operation should be known. Limitations for the transfer operation such as: temperature, visibility, wind, wind direction, wind altitude, rain, fog, ice, snow, blizzard, sea state or any other environmental parameters should be defined. Environmental limits required to suspend transfer operations should be agreed to, and be noted.

Mooring Requirements

- No transfers should take place while the vessel(s) are underway.
- When transfers are carried out between two vessels in open water, fenders should be used to prevent damage.
- While in open water or at anchor engines, steering, thrusters, and manoeuvring controls, must be tested and available throughout the transfer operation.

- When anchoring or securing vessels alongside give due consideration to prevailing and expected wind, weather, ice, and tide conditions. This would include ensuring that moorings (including shore moorings) are adequate to allow for draught and tidal changes during transfer.
- Where appropriate, forward and aft emergency towing wires should be deployed over the opposite side of the vessel from the hose manifold in use and these tow wires are to be available for immediate use.

Vessel /Facility Arrangements

Valves

- Prior to commencing transfer operations, all valves through which oil could be discharged to the sea should be inspected to ensure that they are closed, or if they are not used in the operation, they should be secured to prevent accidental opening.
- Ensure all valves and pipelines required for the current transfer are open and operate through their full range. All other valves and pipelines in connected systems should be closed and secured. Double-check the valve arrangements with the assigned crew members and the transfer supervisor.

Scuppers and Freeing Ports

- All scupper holes to which oil would have access in the event of a spillage should be plugged liquid tight for the duration of the operations. Accumulations of water and snow should be periodically drained off the deck, and the scupper plugs replaced immediately after the water has been cleared. Freeing ports and other open areas where spillage could go overboard should be sealed.

Containment and Absorbents

- Where permanent containment arrangements are not fitted, portable containment devices such as drip trays of sufficient size should be placed under the hose couplings, fuelling connections, flanges and the corresponding tanks' vent pipes before and during the operations. These containment arrangements are to be drained or emptied as necessary. Where no facilities exist for proper drainage of hoses and pipelines, the couplings should be suitably blanked immediately on being disconnected.
- An absorbent material, such as sand, sawdust, peat, sawdust or an oil absorbent should be available. This material should be located in areas such as flexible hose connections and other predictable minor spill locations, at all times to deal with any small spill which may occur. Any oil spilled should be immediately cleaned up and contained for subsequent disposal. Spilled oil should not be washed overboard.

Accommodation Areas

- Ensure accommodation deck doors, deadlights or shutters, ports, and vents are closed.
- Ensure vessel air conditioning systems are on re-circulation mode.

Navigation Bridge/ Shore facility control area

- Ensure vessels hoist the appropriate signals by day and night.
- Announcements of an impending transfer should be made, on board the vessel(s) and at shore facilities on public address systems;

Preventing Sparks

Hot-work

- Suspend all operations that could cause ignition hazards around deck tank vent areas, such as:
  - welding and other hot work,
  - use of portable electrical apparatus, particularly extension cords,
  - use of portable combustion engine driven equipment,
  - other operations which could cause ignition hazards.

In addition to sparking from hot work, use of certain metal tools and materials may cause sparks. Therefore, cold work which may propagate sparks or provide ignition sources should be avoided during transfer operations.

Smoking

Smoking should be strictly prohibited while carrying out transfer operations except in designated areas.

The designated smoking areas should be clear and limited. Smoking notices specifying the designated smoking areas should be exhibited in conspicuous places. In areas where smoking would be hazardous during the transfer operation "No smoking/no naked lights or flames"; warning signs should be posted.

Matches and Lighters

While carrying out transfer operations, the carrying and use of matches and lighters should be prohibited except in the designated smoking areas.

Portable Radio/ Wireless Phones/ Portable Electronics/ Lamps and Flashlights

Portable R/T sets, lamps and hand lamps or other electrical devices should not be used unless approved as intrinsically safe by a competent authority. The use of portable electric lamps and equipment on extension cords or wandering leads generally are prohibited anywhere while carry out transfer operations. Portable domestic radios, photographic flash equipment, portable electronic calculators, tape recorders, wireless telephones and any other battery powered equipment not approved as intrinsically safe should not be used on the tank deck area of the tanker or in any other place where hazardous vapors may be encountered.

Sat/Coms and MF/HF Radios

- Radiated energy from HF radios and radar antennae can cause arcs or heat, which can affect nearby ship superstructures, causing an ignition hazard. During transfer, if high gas concentrations exist, these systems and equipment should be used with caution.
- Satcom antennae and positioning systems are normally not classified as explosion proof electrical equipment, therefore gas concentrations should be carefully checked before satellite terminals are operated on vessels transferring volatile cargoes.

Engine Room

- During ship-to-ship transfer, main engines on both vessels should be available for the entire operation period:
  - engine's exhausts should be monitored for sparks,
  - spark arrestors should be checked prior to arrival,
  - boiler soot blowing should not be carried out during transfers.
- Ground faults found on the main switchboard should be traced and isolated immediately to prevent arcing.
- All ventilators through which vapor emissions may enter accommodation or machinery spaces should be closed.

Safety Zone- No Un-Authorized Personnel

Transfer supervisors should establish the number of personnel required for carrying out the transfer safely. Only those personnel necessary for the transfer operation should be allowed in the area of the transfer operation.

Crewing Safety

Nothing in these guidelines should interfere with responsibility in observing the normal safety, fire prevention and security precautions.

The following safety guidelines should be observed:

- All operations personnel should be versed and rehearsed in emergency procedures and in the use of fire fighting equipment;
- Sufficient personnel and relief crews should be available to deal with intended transfer operations and to allow for sufficient rest and food breaks;
- Routine checks should be made of mooring arrangements and fenders, as well as gangways and nets, if in use.

The area in which the transfer is to take place should be checked to ensure:

- the hose landing and handling area is free of obstructions and hazards; and
- manifolds and bollards on the beach or shoreline are adequate, and clearly marked for high visibility.

Safety Equipment

The following equipment should be readily available for quick deployment, or depending on prevailing conditions, worn:

- Life buoys, and other lifesaving equipment; for quick deployment (Note: powder/rocket type line throwers should not be used).
- Approved Lifejackets/PFDs
- Appropriate cold weather clothing for personnel where required.
- Flashlights Lights when conditions require
- First Aid Kit
- Reflective material on personnel for locating at night
- Other types of safety equipment such as retention lines and head gear if required

Fire Fighting Equipment

Fire fighting equipment should be prepared for rapid deployment before commencing transfer.

- A fire extinguisher should be readily available, and a fire hose should be rolled out on deck at instant readiness, close to the manifold in use.
- When conditions are expected to remain below freezing during the transfer period, water or foam lines on open decks and unheated areas should be kept dry to prevent freeze up.
- Vessels that have fire fighting systems, including main and emergency fire pumps shall keep them ready for immediate use.
- Portable extinguishers, of the dry chemical powder type, should be available and positions as required.

Lighting

Shore facilities, and vessels should be supplied with adequate lighting to effectively allow the safe monitoring of loading operations during the hours of darkness. Flood-lights or other acceptable devices must be available to illuminate the water area around the export tanker so to monitor the configuration of the hoses and immediately detect an oil spill.

- Work boats involved in maintaining floating hoses should be equipped with spotlights for hose inspections and related work; and
- Flashlights and other portable and fixed lighting apparatus, should be designed and constructed according to approved specifications for operation in flammable or explosive gas areas. All electrical devices fixed or portable must be intrinsically safe and of the type approved and maintained for use in hazardous areas.

Because transfers in the Arctic may take place during periods of the season when darkness prevails, extreme care should be taken to ensure sufficient lighting not only to address the immediate transfer operation but to also ensure surveillance of the area around the transfer for spillage which may not other wise be detected. Sufficient lighting should be provided to permit this additional surveillance.

Communications

Good communications are essential for a smooth transfer operation, and are vital in a crisis. situation.

- Means of communication should be continuously maintained throughout transfer operations between the supplier and the receiver.
- Communication should be checked and all signals used should be thoroughly understood by both parties before commencing operations.
- The transfer supervisor should have the capability, for "full break-in" to the radio system or network, where possible, or a radio channel dedicated exclusively to the transfer operation.
- During transfer of volatile, low flashpoint products, hand-held radios should be used which:
  - are intrinsically safe
  - have a VHF or UHF band, with adequate range, and
  - are on a channel or frequency agreed to by suppliers and recipients,
- Fresh batteries should be installed before the transfer commences, and replacements should be available to ensure continuous operation of the radios throughout the transfer period. (Note: battery life is shortened by cold weather conditions).

- All personnel using radios should be on the same channel or frequency (this should be verified);
- For bunkering operations, there should be adequate communications between the deck bunkering station and machinery control room;
- Standard signals should be used in all transfer operations, the following are offered as suggestions:

  -STANDBY TO START TRANSFER
  - START TRANSFER
  - SLOW DOWN TRANSFER
  - STAND BY TO STOP TRANSFER
  - STOP TRANSFER
  - EMERGENCY STOP

In all transfers, each party has the right to suspend operations at any time; if they decide it is necessary.

Hose Preparation and Handling

When preparing and passing the blanked or capped hose between the Supplier and Recipient, the following procedures should be observed:

- Decide who will supply the transfer hose and establish hose configuration taking into consideration factors such as hose diameter and maximum loading rate.
- Check for a valid hose certificate, confirming that the hose has been satisfactorily inspected during the past 12 months. Each hose should bear the following durable indelible markings:

  "For Oil"
  date of manufacture
  bursting pressure
  working pressure
  dates of last testing
  pressure applied under testing

Depending on their design, the elements of each hose set should meet accepted standards.

- Examine "O" rings and joints in couplings and replace any damaged seals or gaskets.
- Minimize the number of couplings by using longer hose lengths.
- Where the ambient temperature is below freezing point, pipe joints should not be made with moisture absorbing gasket materials, as these may leak if the pipeline temperature rises during transfer of warm liquids.
- Inspect hose-to-coupling clamps visually to ensure good condition and security and repair or replace any damaged clamps, where possible, or use spare hose lengths.
- Examine the complete hose system carefully and repair or replace any damaged hoses, flanges or joints, before starting the transfer.
- In vessel to shore transfers use a suitable boat to send the hose ashore.
- When transferring sea hose ashore, ensure the hose is free from chafing, or pinching between ice floes or rocks.
- Ensure the hose is suitably supported throughout the handover, and during the transfer, to avoid damage and prevent kinks
- Use hose strain relief system with long floating hose transfers to prevent strain on the hose string from winds, tides, and ice.
- Decide how hose purging will be carried out at the end of the transfer.

Extreme cold conditions may cause failure of metal, fabric, and plastic parts, render them brittle, cause binding or freezing, and impede the operation of hoses and pumps. In addition, condensation may freeze and create operational problems. All equipment should be inspected for these potential problems and careful oversight maintained during operation to permit immediate interruption of operations should failure occur.

TRANSFER OPERATIONS

Watch standing

The following procedures should be followed before and during a transfer operation:

- Have a responsible person, with an operational radio set on the correct channel/frequency, near the cargo/transfer pump start/stop control throughout the transfer;
- Ensure the product is going to the correct recipient tank;
- Start pumping at a previously agreed slow rate, which rechecking hose string for leaks;
- Maintain the normal pumping rate, as agreed with the other party, until topping off is required;
- Examine the hose string regularly during transfer and watch for signs of undue strain, bulging, and other evidence of real or potential leaks;
- For floating hose, patrol the string, check the water in the area for leakage signs, and look for coupling problems, or snags on ice floes;
- Check both Supplier and Recipient tanks regularly for both content level and product, and investigate any anomalies, suspending the transfer if necessary;
- Keep a constant check on the pumping pressure and immediately investigate any pressure variations of an unexpected nature;
- Make regular visual checks of the water immediately surrounding the vessel(s) and transfer area;
- Reduce transfer rate, when Recipient tanks are nearly full, for topping off; and
- Whenever possible, use an automatic stop device which will shut down the pump when the flow rate or back pressure exceeds a pre-set level.

Emergency Stop

If any of the following conditions occur, the transfer should be stopped immediately:

- Lost communications;
- Loss of ability to monitor hose system;
- Sign of spillage, or damage to hoses and couplings;
- Any detection of accumulated gases;
- Major increase in wind and/or swells;
- When an electrical storm is present or predicted;
- Severe ice conditions;
- Severe conditions visibility conditions;
- Injury or imminent threat

CONTINGENCY PLANNING

Contingency procedures are vital in the event of an oil spill

Contingency plans are needed to minimize the effects of a spill. With that in mind, you require:

- a contingency plan for vessels such as "Shipboard Oil Pollution Emergency Plan", and a plan for the shore facility. Those responsible for implementing the plan(s) must be assured there is no overlap or confusion in responsibility between the vessel(s)/shore facility.
- trained crew, to participate in exercises with the equipment provided are an essential part of the contingency plan.

Transfer supervisors shall discuss and agree upon actions to be taken in the event of an emergency involving a fire on board the vessel or at the shore facility, or if an oil spill was to occur. This action planning should include means of communications and emergency procedures, and may include some or more of the following items:

- Sounding emergency alarm (Sound one or more blasts of the ship's whistle)
- Sounding of Ship's internal emergency signals
- Stopping of loading operations.
- Alerting escort tug.
- Mobilization of emergency teams and fire fighting equipment.
- Vacate the berth using an emergency departure procedure.
- Immediate deployment of equipment to protect environmentally sensitive areas
- Immediate deployment of equipment to contain and collect all spilled oil
- Options for the disposal of contaminated clean up materials

In the event of a spill, the Spill Contingency Plan should be initiated immediately.

Responsibility for Spill Response Equipment

Identify the individuals responsible for containment and clean-up in the contingency plan.

Identify the location of all containment and clean-up equipment.

Vessels are required to deal with on-deck spills.

Taking into consideration the remoteness of northern locations where oil transfer operations occur, it is prudent to have spill response equipment available for minor spills in the water.

POST TRANSFER ACTIONS

When the transfer has been completed, the following procedures should be followed:

- Purge the hose by previously agreed method, and shut all manifold and tank valves. When purging ensure that no air will be introduced to the tanks at the shore facility.
- Confirm that the facility or vessel(s) are secure by carrying out a final visual inspection.
- When recovering hoses for storage measures should be taken to prevent hose breakage due to vibration, pulsation or rubbing with the deck edge or ship's rail or impact against the deck, etc.; for example, by laying and supporting hoses using special lifting bridles and saddles.

Although over-filling of tanks is the main cause of oil spill during bunkering operations, damaged flexible hoses are another important cause. Flexible hoses should be inspected, tested and maintained in accordance with manufacturer's specifications and any appropriate national regulations.

APPENDIX A -SPILL RESPONSE EQUIPMENT

The list of equipment provided here is a recommendation only and is for the guidance of transfer supervisors intending to equip with clean-up equipment.

CONTAINMENT EQUIPMENT

Sufficient containment equipment to completely encircle the vessel or the largest barge in a tow, in case of tug/barge operation, complete with accessories to deploy and maintain in a workable condition.

SKIMMING EQUIPMENT

Sufficient skimming capabilities to recover, within 48 hours, a volume equivalent to the largest tank of the vessel, or the largest barge in a tow, in case of tug/barge operation.

SORBENT MATERIALS

Sufficient absorbent materials to maintain operations for a period equivalent to the lead time expected for replacement stock to arrive on site or 48 hours, which ever is greater.

MISCELLANEOUS VESSEL OR BARGE BASED EQUIPMENT

All other equipment which could be useful and would be available to a response crew in the initial 48 hours following a pollution incident.

APPENDIX B – OIL TRANSFER CHECKLIST

Vessel preparation	✔	Emergency procedures	✔
Valves:			
Overboard discharge valves closed…..	—	Crew should be versed and rehearsed in:	
Valves not in use, secured……	—	Emergency procedures…….	—
Transfer valves and pipelines operate through full range…….	—	Fire fighting equipment……	—
Double check arrangements with crew.	—	**Routine check moorings and fenders**…..	—
Scuppers and freeing ports plugged…..	—		
		Safety equipment:	
Containment and absorbents:		Lifebuoys……	—
Permanent containment ……...	—	Approved lifejackets/PFD……..	—
Portable containment ……...	—	Appropriate cold weather clothing..	—
Absorbent material……...	—	Flashlights……...	—
		First aid kit……..	—
Accommodations:		Reflective material on personnel at	
Doors, deadlights/shutters/ports/vents closed……	—	night…….	—
Air conditioning re-circulations mode..	—	**Fire fighting equipment:**	
Accommodation ventilation shut……..	—	Fire extinguisher……	—
		Fire hose rolled out on deck……..	—
Navigation bridge including shore facility control area:		Fire fighting systems, main and emergency pumps on standby……	—
Hoist appropriate signals……..	—		
Announcement of impending transfer..	—	Lighting:	
		Adequate lighting vessel(s) shore	
Restricted activities		facilities……...	—
Hot work……...	—	Work boat equipped with spotlight.	—
Smoking (except designated areas)…..	—		
Matches and lighters……	—		
Portable electric lamps…….	—	**Transfer hoses:**	
Equipment on extension cords…….	—	Valid hose certificate……	—
Unless intrinsically safe, restricted use of:		Indelibly marked:	
Portable R/T sets……...	—	"For Oil'……	—
Lamps……	—	Date of manufacture……...	—
Hand lamps……...	—	Bursting pressure……	—
Flashlights…….	—	Working pressure……	—
Other electrical devices…….	—	Date of last test……	—
Portable domestic radio……	—	Pressure applied under test…….	—
Photographic flash equipment……..	—		
Portable electronic calculator……	—	Examine	
Tape recorders……...	—	Condition of "O" ring/joints……	—
Wireless telephone……	—	Hose to coupling clamps…….	—
Other battery powered equipment…….	—	Complete hose system…….	—
Radiating HF radios……..	—		
Satcom and positioning systems……..	—	Hose strain relief system for floating hose	
Engine Room:		transfer……..	—
Engine exhaust monitored for sparks…			
Spark arrestor functioning……	—		
Boiler soot blowing not permitted……	—		
Ground faults traced and isolated…….	—		
Machinery spaces ventilation shut……	—		
	—		

Pre transfer preparation person in charge to	✔	**Pre transfer briefing including**	✔
	—	Supervisors award of expected duties……..	—
Inform local authorities……		Emergency procedures……	—
		Oil spill contingency plan……	—
VHF navigational warning	—	Manifold/fueling station location……..	—
Vessel name(s)……..	—	Daught……Max _____……..Min____	—
Location……..	—	Vessel length…….._____	—
Nature of transfer/duration……	—	Fender arrangements……...	—
Request wide berth……	—	Shore manifold connection……..	—
Cancel warning…….		Jetty shore characteristics	
		Tides……..	—
		Bollards/mooring……..	—
		Positioning aids……	—
		Hazards……...	—
Environmental conditions	✔	**Communication:**	✔
Verify forecast	—	Continuously maintained during transfer operation…….	—
		Communications check and understood by crew……..	—
Establish conditions limits		Transfer supervisor “full break in” or	
Temperature ……____ ^{O}C/F	—	designated channel……	—
Visibility ……____ NM	—	Hand held radios fresh batteries and	
Wind speed ……____ Knots	—	spares……	—
Wind direction……____	—	One designated channel……	—
Wind altitude ……____	—		
Rain ……____	—	**Mooring requirements:**	✔
Fog……..____	—		
Ice ……____	—	Fenders in proper locations……	—
Snow ……____	—		
Blizzard ……____	—	Open water or anchoring:	
Sea state ……..____	—	Tested and on standby	
Other……____	—	Engines……	—
		Thrusters……...	—
		Ship control……...	—
		Anchoring or securing alongside	
		Environmental conditions……	—
		Expected draught and tidal changes..	—
		Where appropriate outboard fore and aft emergency towing wires…….	—

APPENDIX C- FURTHER REFERENCE BIBLIOGRAPHY

A Guide to Contingency Planning for Oil Spills on Water, International Petroleum Industry Environmental Conservation Association, March 2000, London.

Arctic Waters Oil Transfer Guidelines (TP 10783), April 1997, Transport Canada, Prairie and Northern Region, Marine. Ottawa.

Contingency Planning for Oil Spills, Technical Information Paper No 9, International Tank Owners Pollution Federation, 1985

Guidelines for the Operation of Tankers and Barges in Canadian Arctic Waters, April 1997, Transport Canada, Prairie and Northern Region, Marine

Helsinki Convention – Guidelines on Bunkering Operations and Ship to Ship Cargo Transfer of Oils Subject to Annex 1 of MARPOL 73/78 in the Baltic Sea Area, June 2003

International Convention for the Safety of Life at Sea, 1974

MARPOL (73/78), Annex 1

Manual on Oil Pollution, Section II, Contingency Planning, and Section IV, Combating Oil Spills, 2001, International Maritime Organization, Marine Environmental Protection Committee, London

Oil and Other Hazardous Substances Pollution Control, Article 1 Oil Pollution Prevention Requirements, Transfer Requirements, Department of Environmental Conservation, State of Alaska, January 2003, Juneau, Alaska

Oil Spill Response: Options for minimizing adverse ecological impacts, 1985, American Petroleum Institute, Washington, DC

Oil Spill Response Field Manual, Exxon Production Research Corporation, 1992, Houston, Texas

Oil Spill Risks for Tank Vessel Lightering, Marine Board, Commission on Engineering and Technical Systems, Ocean Studies Board, 1998, Washington, DC

Ship Safety Standards & Guidelines for the Construction, Inspection & Operation of Barges that Carry Oil in Bulk, Transport Canada

Standards of Care for Lightering Within the Waters of Puget Sound and the Strait of Juan de Fuca, Puget Sound Harbor Safety Committee, May 2001, Seattle, Washington

Tanker Handbook for Deck Officers, C Baptist, Brown Son, and Ferguson