Company of Master Mariners of Canada (CMMC)
"Arctic Shipping: Planning for Emergencies"
Halifax, Nova Scotia, Canada

DAY 1
Tuesday, April-21-09 1pm –5pm

First Scenario Panel Discussion - Arctic Emergencies Exercise:

- **A) Saturday evening scenario:**
  Passengers divided up, taking part in different activities. Chances of taking good pictures of Walruses. About 17h00. As ship has been working its way down Cardigan Strait, officer trying to avoid heavier ice flows. Captain called to the bridge – getting quite close to shore. Ship going at slow speed and strikes an object. Ship must be stopped and do an initial assessment – it appears you have water in No.4 fuel tank (port side), and that's the only thing you found. Everything else seems to be in good order.

- *Captain's initial thoughts:*
  - There is some oil leakage from the hit fuel tank...would push chief engineer to inspect all the tanks. Make sure there's no more leaks...hopefully this is a small one, but chances are it will be bigger.
  - Will do a general muster of the vessel as well.
  - Will make a call to the office – will give them the situation – a full tank has been hit, not sure if any others have been affected – chances are there have been more affected. Keep going with muster stations; will update the office when they know more.
  - Look at possibility of anchorage – to the east of Collin Archer...about 20 miles away. Might make his way toward this anchorage...no other areas to do this. Will head toward possible anchorage. As he knows more about the situation, he'll make his decision as to what to do next.

- *Designated Personnel Ashore (link between company and the captain...has direct communication to CEO of the company):*
  - Also is emergency response coordinator since he's taken the initial call
  - Will determine through discussion if they should call in the shore-based emergency team
  - Find out what contact the captain has made to other vessels, coast guard, etc and stay in constant contact w/ the ship
  - Next call would be to president of the company

- *Company Head Office:*
  - Would do his own situational assessment...probably no major reason to panic at this point in time
  - He would most likely call his ops/technical manager to be on alert

- Would be concerned about passenger situation....make sure we're prepared to deal with not only authorities but also the media
- Would agree as to who says what to who (between him and marketing sales manager)
- Would assess whether they should inform some of the orgs/companies that have passengers on board. Would gather his team and inform the passenger...not quite yet, but would put the process in place.
- Sometimes our passengers are just as quick to respond to the situation with calling, etc as we are....or faster. Word might spread via passengers to those at home faster than the company can deal with it.

- **B) They have also found water in No. 6 Fuel Tank:**

- *Captain's thoughts:*
  - He would try to find out where everyone is on the boat...since this is an isolated area, he'd find out what other vessels are in the area
  - Look at schedule with expedition leader...haven't been able to find any other vessels
  - Make an all-stations call out to see what other vessels he can find in the area
  - Has contacted RCMP and explained situation...still thinking about going over to the anchorage...seeing if we can see some of the ice we went into...maybe put some water into healing tanks on the Starboard side
  - He's hoping the ice was what opened up the tanks...maybe he can correct the problem...but chances are he won't be able to see at this time of the day. Will see if he can fix this hole, chances are it's not going to happen.

- **C) Passengers see fuel leaking and walruses being affected...they want to go protect the**
  walruses and ask the captain if they can do this:

  - *Captain says no*...He has to think about safety of crew, passengers, vessel, and then the environment....needs to evaluate the situation. Unfortunately at this point in time animals are last priority.

- *Company Head Office:*
  - Captain should follow the Oil Emergency Plan....do checks of the tank, get rescue crew ready. Call in emergency response team...call in all response members to start dealing w/ the situation
  - Need to notify Maritime Rescue Centre and Transport Canada, and list of other contacts on Eastern Coast of Canada...Search and Rescue Centre, DMV, their administration, and would initiate the call with E&I

- *Transport Canada:*
  - Concerns are initially the status of passengers and crew on board...that all are accounted for and healthy

    - Concerned about the pollution and measures that have been taken to stop the outflow
    - Also whether any clean-up has been possible
    - Is the vessel still afloat? What is her structural state? Is it compromised that she may pose a navigational hazard or be unable to reach her next port?
    - What are your plans for getting the vessel and people on board to safety?
    - Normally communication with ship is through the Marine Traffic Centre. Or would deal w/ company headquarters if the call has come directly from them

- *Search and Rescue:*
    - Mandate is to save lives...right now no threat to life so standing back and monitoring, but are ready if needed.
    - Would have already known about this situation b/c received the call earlier from the RCMP when the captain made that call.
    - Talking to Joint Task Force North (Canadian Military)
    - Figuring out how long it would take to get there, etc. Right now the contact is with the ship itself

- *Coast Guard:*
    - What is the status/extent of the spill? What is the extent of the environmental impact?
    - Worth with Environment Canada...what are the major risks in that area so we can get appropriate equipment into the area
    - Finding the willing, able, and capable of cleaning up...working with the company as well to see what has been done so far, if anything, what their capabilities are, etc.
    - Would get a first response team in there to get in and start cleaning up...where is the pollution moving within a 24 hour period, and where do we need to get the clean-up equipment to?
    - Try and talk to the vessel directly, otherwise through corporate office or through the Nunavut agent

- *Environment Canada:*
    - Offer any assistance we can give with trajectory modeling, i.e. forecasts, etc.
    - Would offer to activate the Arctic REET (Regional Environmental Emergencies Team) – comprised of territorial and federal government agencies that can provide consolidated advice on impacts and also on where the environmental resources are that are threatened. Can also provide more information on the sensitivities in the area and modeling to show where the oil is going to go.

- *Company Head Office:*
    - Situation has changed since last time was involved...b/c we DO have a leak and pollution...need to now involve our insurance companies as well
    - At this point in time will not be discussing with Environment Canada who pays what

- *Insurance Representative:*
    - Would be sending someone from office in NY to attend in your office...to have someone there with decision-making ability from the part of the underwriters
    - Would try to help identity resources that are available...tug assistors? Will be a need for passenger evacuation...even if it's fine, some passengers may not want to go on with the voyage. Will also try to help identity medical resources to help with any problems
    - Would start moving funds to a local account...but closest local correspondent might be in St. John's, NFLD. Company is also going to need legal advice on lots of issues
    - Would recommend that independent science people be brought onto the scene...so we could have independent scientific evaluation of the environmental impact, separate from the assessment from government
    - Would set-up emergency team in NYC office in conjunction with a similar team set-up in Norway
    - Would also help with media consultancy
    - Wouldn't have a bias...first concern always safety of human life, second concern is that for the environment. It's about whoever can get the resources there as quickly as possible to minimize losses
    - Would hopefully be talking to Coast Guard/Emergency Response, and what we could do to help get the resources there as soon as possible

- *Military:*
    - Frigates within Canadian military can't get up there...can't deflect that far north. He couldn't get in there
    - But have some equipment...if he could get there, would bring a tremendous amount of capability
    - Wouldn't recommend them steaming toward him if they're leaking oil...if the ice was lighter, maybe he could. The command would come from Joint Task Force North, or Maritimes Task Force Atlantic...but he would still be taking strict orders from the military
    - Doesn`t think he`d be able to respond
    - He COULD loan the equipment to someone else who might be able to get closer...the ice would be his real problem in getting any closer

- **D) People still want to clean up the oil spill, passengers starting to feel anxious...a lot of anxiety, worried, starting to show medical problems:**

- *Captain`s response:*
    - No doctor currently on board; medical supplies is limited
    - He`d contact shore side...but still wouldn`t make this a priority

- He`s sure he`d be making his way to anchorage right now. Someone looking for valium – he`d hold off. If the medical situation got any more serious he`d contact Resolute or any other close community
- Always good to communicate with passengers regarding what`s going on...get everyone in the lounge, talk to them, calm them down. Tell them the situation.
- Lots of trained expeditionary people trained to deal with seniors in these types of situations

- **E) It`s now 2:30am and the first inkling of this is getting out there and ends up with a member of the media:**

- *Media:*
  - Would be very interested in this...but far away from location, it`s an unusual event and surprise, possible environmental damage, no cell phones, etc.
  - You`d probably have local radio station catching wind of this through Canadian Press or Coast Guard Press
  - Rescue coordination would tell the junior reporter about the situation, and it would go from there.
  - A wall of ignorance would have to be slowly scaled by the responsible authorities
  - Info imparted MUST be basic! People won`t understand technical terms
  - Then you`d have a media circus, likely leakage from the scene by passengers communicating with families, etc. Not all sources are available.
  - Ideal would be to have someone there who knows what`s going on to inform the media of what`s happening so that there`s no misinformation, etc. Especially until they know exactly what`s going on.
  - It`s SO important for reliable forthright information. One lie turns into `super-scepticism
  - Quite often people on the ship don`t have the patience to deal with the media, but they WILL call well-established roots as well as the ship if possible to get the story direct
  - It helps if there is cooperation on both sides
  - For big stories, they`d spend the money to get there and get the story

- *Captain:*
  - Would be polite to the media; but he wouldn't talk to them. He'd tell the media to contact the owners of the company....the captain just doesn't have time to deal with the media...would delegate it elsewhere.

- *Medical Specialist:*
  - Do not start handing out valium like popcorn
  - He'll try to get more a feel from what's actually happened from a medical point of view (in terms of hitting the ground)...was anyone actually hurt? It doesn't take much if you fall awkwardly....you want to plan for the worst, but hope for the best

- Even anxiety can lead to heart attacks in the elderly; need to be proactive
- There should be some level of training, calming people down, psychotherapy on board
- Are any of the other passengers doctors?? Other passengers with some level of health training? He'd want to understand if there are any of these people on board, the level of their skills, etc.
- Is the military involved? Can we get some of them there, or RNs from the Coast Guard?
- He'd expect someone to be designated lead on the medical situation on board

- **F) Situation doesn't get any better...the two tanks still have sea water in them, and now up on the deck directly above they're starting to find some water coming out of coolers, etc. The holes were very close to the deck line...starting to get water on-board:**

- *Captain:*
  - Still making way to anchorage
  - Still probably have a good hour to find out if we can control this...i.e. if the pumps are enough to control it...although he's assuming probably not
  - Can always move the fuel around
  - Wants to see if we're actually sinking (7 tenths ice cover = slow transit to the anchorage point)

- *Company Head Office:*
  - Get in touch with sales and marketing manager...may need to get in contact with Charterer
  - As crewing manager, would also get in touch w/ manning agent to notify next of kin
  - Have the captain assemble the lifeboat teams, passenger rescue teams, etc. Have everything ready if needed.
  - Considering the isolated area, need to be cautious and start taking these precautions right away
  - Would provide technical advice re: the fuel tanks to the ship

- *Captain:*
  - If medical situation comes before water comes in more, he'd hand it off to the response team on-board...let them deal with it
  - Likely water-tight door is open and can't be closed
  - Will tell SIT rep he'll have to get back to them
  - He'll look and see how far they are from desired anchorage point
  - Need to figure out why water tight door isn't going to close....likely it won't though
  - Take passengers into auditorium, keep them informed
  - Back to stations...would like to get the vessel into the beach, if not she'd likely go to the bottom

- Need to get passengers to boat stations, if they need to get into the boats the captain will make that decision as necessary...how close can he get there, and how fast is the water

- *Rescue Coordination Centre - PASSENGERS MUST BE PRIORITY :*
  - Need to know whether the people will be in boats, beached, etc.
  - Would take care of their needs...hotels, safety, health, etc.
  - Would contact Greenland air force base, could definitely be some resources to use there

- *Transport Canada:*
  - Role would turn more into a regulatory role
  - B/c it's a foreign flag ship, they would offer advice if necessary

- *Coast Guard:*
  - Potentially delayed if all resources are delayed elsewhere – toward passengers

- *Military:*
  - If he was asked to do so, he'd disperse helicopter to save the passengers

- **G) Assistance still a long way away:**

- *Transport Canada:*
  - Transport operates national Arial surveillance program for checking for pollution
  - Within hours they could be over the scene...they could pick up equipment and drop it. Carrying capacity nothing like a Herc but could certainly do something!
  - Natural resources Canada has a major camp in the North...they would have helicopters and twin otters and camps in that area....Small scale, but could organize some small scale operations
  - Also a weather station at Eureka, and the territorial government reps would be around
  - Lead agency in this instance would be the Department of National Defence – although RCMP and Transportation Safety Board would be on the scene right away

General Comments Following Panel Emergency Scenario Discussion:

- Captain was surprised as to the right government departments to be involved, who's actually in charge, etc. This could be a confusing situation in an actual emergency situation

- It was generally felt that the ship-reparation diagram/presentation put together by Lloyd's was excellent and in fact a LIFE SAVER in this sort of situation. Assuming

that the ship had an Internet connection on board could connect the people involved in repairing the ship very quickly to try and get things fixed.

- Phone conversation and the immediacy of decisions will be made probably with Transport Canada (from perspective of the Military rep)
- Interesting that Transport Canada got the information second-hand from the RCMP, not directly

- Generally a vessel does NOT actually have direct communication lines to the head office

- Note that a situation very similar to this actually occurred with a cruise ship with about 150 people on board in the same location in the Arctic

- Note: An important issue that was brought up was something near and dear to the Company of Master Mariners: **Criminalization**

    - Insurer also says that criminal council would have also been recommended right away...and to put criminal council on stand-by immediately, as they also recommended having other forms of council on stand-by and ready immediately

- A lot of the passenger ships traveling in the Arctic are NOT reporting to the Arctic Ferries commission...about 2% of the total traffic going through this area
    - If they DID, this information would be automatically disseminated to Transport Canada, Coast Guard, etc.

- If you're looking at major disaster response, you're looking at a national response...not a Search and Rescue stand-by response. It's going to take a while...not going to be able to get the resources needed as soon as may be needed.
    - MUST be able to draw from resources in the North....from the South it will take about 8 hours minimum to arrive to where you are

- Senator of Nunavut mentioned that it's extremely important to consider the following as potential difficulties in trying to bring in/land the Twin Otter in that fjord area in Nunavut and move the people to Resolute Bay:
    - Weather – ice and fog
    - Capacity of helicopters – can only take 22 people at a time
    - Only 25 communities in all of Nunavut – very limited motel space – likely would be housing people in schools, etc
    - Also need to consider the daylight vs. Darkness hours that we're dealing with given the time of year

Arctic Shipping: Planning for Emergencies

22 April 2009

Opening Remarks

Capt. Peter Turner, Company of Master Mariners, welcomed participants to the Workshop, in particular, Senator Willie Adams, Nunavut, and other guests from overseas. Capt. Turner commented on the success of the simulation on 21 April and thanked the Marine Affairs Programme and the Company of Master Mariners for their support for the initiative.

Capt. Jim Calvesbert, Company of Master Mariners, commented on the timeliness of the Workshop as a contribution to Earth Day, reminding us of the sensitivity of the Arctic environment and the timely need to plan for emergencies in this region. Capt. Calvesbert thanked the sponsors of the Workshop, Det Norkse Veritas, the Marine Affairs Programme, American Bureau of Shipping, Lloyd's Register, Praxes Emergency Specialists, and Helly Hansen. This is the third in a series of Arctic seminar sponsored by the Company of Master Mariners, and will focus on the perspective of shipping companies and local communities affected by increased shipping in the Arctic region. Following a brief outline of the programme and procedures for the day, Capt. Calvesbert introduced the moderator of the first panel.

Panel 1: The Ship Owners' Perspective

The Moderator of the first panel, Ivan Lantz, Shipping Federation of Canada, introduced the panel participants.

Martin Karlsen, Polar Star Expeditions

Mr. Karlsen began his remarks by commenting on the relevance of yesterday's exercise for tourism operators in the Arctic, noting that representatives of the Association of Arctic Expedition Cruise Operators (AECO) from Cruise North (Nunavut), Metro Canada, Quark Expeditions, and Polar Star Expeditions participated in the exercise.

Shipowners are aware that, statistically, 80-90% of vessels accidents in remote Arctic destinations are the result of human error. Shipowners need to consider the suitability and capability of the vessel itself. Mr. Karlsen hoped that unsuitable tonnage going into these areas is gone; the international regulatory regime should take care of this and minimize loopholes available to unsafe or inappropriate vessels for expedition cruises. He emphasized the need for

experienced crew to allow the ships to go where they want to go. Given limitations such as poor charting of Arctic waters, we also need to offer captains and their crew the tools they need to successfully complete their voyages. He noted that while vessels traveling into remote areas report things to officials, that information often is not published in a timely manner (unless there is an accident). Mr. Karlsen emphasized that ship owners realize that crew preparation, training and preparedness are critical, particularly since crew members come from around the world but not typically from ice-infested areas. He concluded his remarks by noting that while the expansion of the IMO Arctic Guidelines to include both the Arctic and Antarctic waters is welcome, they should remain voluntary. No amount of regulation will replace the fact that most accidents are due to human error, thus shipowners need to focus on eliminating human error through crew preparation, training and preparedness.

Bob Gorman, Fednav Group/Enfotec

Mr. Gorman noted that the Canadian shipping industry is experienced in Arctic operations, with well trained crew and masters and a robust regulatory regime in place in Canada. His biggest concern was foreign operators who do not report to NORDREG (Arctic marine traffic system) and are not experienced in Arctic operations. He noted that the simulation exercise yesterday highlighted inexperienced crew as the issue in emergency situations. As the Liberian investigative panel noted in their recently released report on the sinking of the *Explorer* in Antarctic waters, it was human error on the part of the captain (misjudging the nature and extent of multi-year ice conditions in the area) that resulted in the accident. He provided examples in the Canadian Arctic, such the carrier that sank in Baffin Bay in the 1980s due to an arrogant captain who didn't understand Canadian ice conditions. These incidents highlight once again the need for experience and knowledge of vessel management in ice-infested waters by captains and crew and ship operators.

Mr. Gorman noted that Fednav operated the MV *Arctic* and MV *Numiat*, vessels of the the highest ice-class in world. Any emergency response in the Arctic will be responded to by commercial operators. The commercial shipping industry understands that the first line of defence in Arctic marine safety is the people on their ships, reinforcing the need for well-trained crew. He noted that Canada has an excellent regulatory regime with good shipping control zones. The safety record in the Canadian Arctic shows that we are doing the right thing.

FedNav ships year around into the Arctic; shrimp boats operate year around in the region as well. However, the Canadian government vessels stop sailing into the Arctic in winter. As a result, shipping companies such as Fednav need to provide weather and ice conditions information themselves; the Canadian Ice Service does not provide its services throughout the winter. The Canadian Coast Guard only operates in the Arctic during the summer months.

Capt. Alex MacIntyre, Arctic Ice Pilot

Capt. MacIntyre opened his remarks noting the dramatic improvement in Canadian ice services and reporting, highlighting the cooperation between commercial shippers and the Canadian Coast Guard Central and Arctic Region office based in Sarnia, Ontario. He agreed with other panellists that NORDREG should be compulsory for all vessels traveling into Arctic waters. Ice pilots want to know where other vessels are their immediate vicinity and help with coordination of services. He noted that additional elements should be included in reporting requirements, e.g., the number of people onboard the vessel. Greenland has a vessel reporting system that is very straightforward and requires reports every 12 hours on six items. Their system is easy for vessels to work with, enhancing compliance.

Capt. MacIntyre commented on the need for more bottom surveys, particularly in the approaches to areas where tanker traffic is expected to increase. Tanker operations, especially where large quantities are being discharged or onloaded, need more services so that vessels are not at the whim of the weather (physical infrastructure). Further work is needed on research on cleaning up oil spills in Arctic waters (Norway is currently doing the most work on this now). While there is a temporary lull in Arctic shipping, a boom in drilling and exploration activity is expected. This will result in increased tanker and bulker carrier traffic, in addition to the anticipated expansion of adventure cruise ships operating in the region (10-12 operators now). The Beaufort Sea area benefited from the infrastructure put in place during period of oil exploration in the 1980s. However, much of it has been removed or degraded and the local expertise is similarly declining or gone from the area. This loss needs to be stemmed or turned around.

Capt. MacIntyre concluded his remarks by highlighting the issue of recruitment of ice pilots/navigators that will be needed to meet the forecast expansion of shipping in the Arctic. Currently, there is a shortage of seagoing personnel worldwide. Youth do not want to go to sea; the Canadian Coast Guard College had trouble filling its quota last year. Graduates often take land-based work rather than going to sea. Licensed officers and engineers with Arctic experience are even more difficult to find. He noted that Arctic conditions can be found in Gulf of St. Lawrence as well, further expanding the need for crew experienced in working in ice and cold conditions. Capt. MacIntyre commented on the lack of standards for ice qualifications. He noted that inexperience gets you into trouble very fast, citing the example of the *Explorer*. Further, there is a lack of facilities in the Arctic if you get into trouble. He noted the need for a good coordinator to bring all elements together in an emergency situation so that the reaction to an incident is appropriate and strong enough up front to deal with the conditions in the region.

Discussion

Professor David VanderZwaag, Marine and Environmental Law Institute, Dalhousie University, asked panellists whether or not they thought that twinning of cruise ships and other tourism vessels should be required. Mr. Karlsen responded that this was popular in Antarctic waters where there are more vessels and ships regularly talk to each other. A similar system is in place in Svalbard and Greenland. The Arctic tour operators are prepared to expand this system into

Canadian waters. Currently, there is an understanding between companies and masters to check with each other. He noted that in the Southern Ocean there is no regulatory regime governing the marine tourism industry, but that there are regulations in place in Arctic waters. As vessel operators, they expect that Arctic governments should provide some emergency services. To date, ships have been able to deal with emergency situations themselves and that is okay. Theoretically, the current international regulatory system should reduce the number of emergencies in the first place (i.e., setting construction standards to minimize the chance of sinking quickly). In the event there is another vessel in the immediate vicinity, it becomes an extended lifeboat. However, regulations in place preclude such a vessel's ability to sail off with the extra passengers making this technique is a limiting factor in dealing with emergency situations.

Sentator Willie Adams commented on the issue of the impact of tourist vessels arriving in small coastal communities citing the limited notice that is provided to people on shore. He noted that tourists looking for an local experience and locals want to provide a proper welcome and offer the services and goods that the tourists seek and the communities are anxious to provide.

Mr. Karlsen responded that this is an issue in Canada but not elsewhere. Most cruise ship operations in the past have been to non-populated areas but that is changing, particularly in Greenland and Canada. The AECO Guidelines for Expedition Cruise Operations in the Arctic and Guidelines for Visitors to the Arctic set out standards on how to deal with communities and to teach tourists appropriate behaviours and educate passengers respectively. Eastern Greenland, where there is limited vessel traffic, is more similar to the Canadian Arctic and cruise ship operators now have a good relationship with both these communities. Locals often come aboard vessels to showcase their local culture. Vessel operators do not want to inadvertently ruin heritage sites ashore and industry officials have taken steps to work together and ensure that local communities and visitors alike are accommodated satisfactorily.

Capt. MacIntyre also commented that there is a mutual benefit to both parties when both sides are organized. He suggested that compulsory NORDREG reporting would also help determine routes and planning for local communities.

Peter Charin, Company of Master Mariners, commented that looking at Arctic as a circumpolar region, there are varying standards as to ice knowledge required on board vessels. The United States requires that an ice pilot be on board at all times. As panellists had noted, the quality of ship and crew are equally important. Would there be an opportunity to put in place an international regime with an automatic flow, particularly with regard to the standard of vessels, between circumpolar nations?

Mr. Gorman responded that everyone is working on unified polar rules. The IACS Polar Code provides some of this. It is unlikely that Canada, the United States and Russia would standardize regulations due to sovereignty considerations. In Canada, the AIRSS (Arctic Ice Regime

Shipping System) is very difficult to deal with; Russia has a separate regime for the Northern Sea Route. While some progress has been made on harmonization of these ice regimes, it is not likely that there will be a common circumpolar regime any time soon.

Mr. Karlsen commented that passenger vessels meet SOLAS international standards. However, national standards are not necessarily up to international standards. Passenger ships tend to meet the international standards as they travel worldwide, so this stands Canada in good stead.

Capt. MacIntyre noted the depending on the rating of the vessel, the ice advisor onboard will have to be able to work with various ice conditions and regimes.

Mr. Karlsen responded that, as a ship owner deal with insurance and passengers, you can regulate yourself too much. However, the Polar Code is useless if does not define what clearly define ice coverage and ice-infested waters.

Joe Spears, Horseshoe Bay Marine Group, asked panellist whether or not they thought Canada should mandate a regular Arctic exercise.

Mr. Karlsen responded that for polar regions, international standards are more useful as the risks are the same across Arctic countries from an operational point of view.

Tony Patterson, Master Mariner, Newfoundland, commented on the quality of seafarers and their experience. Traditionally, Canada's training paradigm has been through mentorship. However, impending retirements of a generation of mariners will make this strategy difficult to sustain for the next generation. Given the clear need for practical experience in ice conditions beyond that called for under STCW, he asked panellists what they thought was required to meet training and personnel needs for Arctic shipping.

Capt. MacIntyre responded that opportunities to gain Arctic experience are limited due to limited traffic and exploration operations. Mr. Karlsen noted, however, that Fednav offered useful training through its cadet program and its inhouse simulator on ice navigation. He did note, however, that there is a real lack of certified training opportunities with a certificate of ice competency available for seafarers.

Capt. MacIntyre responded that the challenge of find seafarers for their vessels is not yet a problem. He noted that it is difficult to regulate competency in ice navigation in people; certification alone is not enough. Human error is still a problem. Thus we need training and practical experience and suitable tools (e.g., forward looking sonar, charting improvements, new electronic tools such as satellites, etc) to help with ice navigation.

Dave Jackson, Canadian Coast Guard, noted that the forthcoming Arctic Council Arctic Marine Shipping Assessment (AMSA) report will include recommendations related to harmonization of Arctic regulatory regimes and training requirements.

Mr. Karlsen noted that there are questions concerning recognition of other countries' certification in ice navigation.

Capt. Angus McDonald posed the question, How do you assess senior crew before you put them to sea in the Arctic? He noted the difficulty in getting good officers today and suggested that good pay and working conditions would likely be factors in retention.

Mr. Karlsen responded that Polar Star Expeditions has a low turnover of officers and crew. The company has an internal system of quality assurance that uses outside expertise as required. He commented that suitably trained and experienced crew recruitment and turnover was less of a concern for passenger vessels and is more problematic for cargo vessels. Passenger vessels can always change their itinerary to avoid particular ice conditions; cargo vessels must continue to their destination despite ice conditions. A new international endorsement of certification could be considered.

Dick Hodgson, Marine Affairs Programme, commented on the limited number of development proposals currently in place. He cited one active example though, the Baffinland Mary River Iron Ore Project that will see ships carrying ore every second day from Baffin Bay to Rotterdam. He inquired as to the status of the environmental impact assessment (EIA) and how the Canadian government will manage the anticipated 125 DWT shipments annually.

It was noted that the Nunavut EIA had set out the terms of reference and was doing preliminary work. It is expected that the EIA will be completed by the end of 2009 or early 2010 and that it will look at the whole project, including ballast water management. The anticipated start date for the Project is 2015–2106. Given the current economic climate, resource companies are looking at building a more economical project. The impacts and benefit agreement is currently being negotiated. It is expected that the vessels used in this project will be foreign-flagged. It is anticipated that port state control measures will be put in place through Transport Canada with permanent staff in place at Mary's Bay.

Peter Timonin, Transport Canada, commented on crew certification and how shipping companies need to ensure qualifications through experience (i.e., working up through the ranks). Measures to attract individuals into seagoing careers need to be considered. He suggested that the Company of Master Mariners could get out into the high schools, etc. to attract new recruits to the profession.

Aldo Chircop, Marine and Environmental Law Institute, Dalhousie University, asked panellists about the future of pilotage in the Arctic.

Capt. McIntyre responded that pilotage in the Canadian Arctic is under the jurisdiction of the Great Lakes Authority. The need to recruit into pilotage coincides with the shortage of seagoing

officers. There has been a shift in how younger officers on vessels aim to become a pilot (traditionally worked their way to master level and then moved on to pilot); training directly as a pilot is more popular today.

Panel 2: Local Communities' and Arctic Partners' Perspective

Marc Allard, Makivik Corporation both chaired this panel and made a presentation.

Marc Allard, Makivik Corporation

Mr. Allard, reviewed the oil pollution response, including search and rescue, capacity in the Nunavik marine region. He outlined the area under consideration; the Nunavik region borders Ungava Bay, Hudson Strait and Hudson Bay and encompasses the northern part of Quebec. It is comprised of 14 Inuit communities with a population of almost 10,000 Inuit. It was created through the James Bay and Northern Quebec Agreement of 1975, and together with the Labrador, Nunavut and Inuvialuit claims, comprises the Inuit land claims regions.

The Makivik Corporation is a non-profit ethnic organization created through the land claim agreement to represent, promote and protect the interests of the Nunavik Inuit. Its mandate is to manage the Inuit heritage fund provided for under the agreement, promote the preservation of Inuit culture and language as well as the health, welfare and education in communities, and to promote economic growth by creating Nunavik-run businesses. To date, these business ventures include airlines, marine shipping, commercial offshore shrimp licenses with a 5,000 tonnes quota and Cruise North for tourism ventures.

The Nunavik Inuit Land Claims Agreement includes an offshore agreement ratified on 10 July 2008 that provides priority access to resources found in coastal waters and offshore islands for Nunavik Inuit and for the creation of entities to promote and protect local resources and with priority given to sustaining subsistence harvesting of marine resources throughout the region. The marine resources in the region include shellfish, marine birds, marine mammals, marine fish and seaweed. Activities include a nutraceutical project involving marine seaweed.

The Nunavik region faces many challenges. The northern economy is evolving with increased community development (including marine infrastructure) and regional development of industries such as tourism, outfitting and mineral exploration and exploitation. Climate change is affecting the North and is expected to result in increased shipping and community development through the funds provided under the land claims agreements and increased regional development (e.g., ecotourism, ongoing mineral exploration and mining for uranium, nickel and gold extensive). Decreased ice cover and thickness will increase the risk of marine incidents and risk of stranding of individuals on the ice. Other issues that will need to be addressed and affect these development opportunities include the provision of suitable infrastructure to deal with the

45 foot tides in Ungava Bay (greater than those in the Bay of Fundy) for vessels offloading in local communities. Overall, marine shipping faces risks from icebergs, bergy bits, high tides and strong currents, limited hydrographic information (uncharted waters and old charts), lack of navigational aids, and predominant wind and current directions (an oil spill offshore would come onshore).

The 1990 Brander-Smith Report made several recommendations related to marine shipping, including provision of dedicated floating environmental monitoring and clean-up platforms, housing clean-up equipment aboard Coast Guard icebreakers, and requiring tankers and barges to have oil spill containment and recovery packages on board. The latter recommendation is probably the only one that is in place. The Report also called for an enhanced local response capability in Arctic communities with pre-positioning of equipment for dealing with oil spills but it unclear how extensively this recommendation has been operationalized and whether or not there is appropriately trained personnel in the field to respond rapidly to an emergency. Overall, local communities need to enhance their response time and be better equipped and trained to respond to an oil spill incident.

Bill Drew, Port of Churchill

Mr. Drew reviewed the facilities at the Port of Churchill, Manitoba. The port services the coastal communities of Hudson Bay to the north during its less than four month ice-free season. Approximately 20–35 international vessels call at the port per year with shipments of 400,000 to 750,000 tonnes of grain outbound annually (inbound shipments of fertilizer are also significant). There is also increasing tug and barge movements up to Rankin Inlet and Baker Lake. Supply vessels now call on the port and cross-dock work from rail to barge/supply ship is growing. Cruise ship activity has increased with Cruise North looking to expand its operations in the region. There is also significant small vessel traffic of both commercial operators and personal recreation boating. There is lots of cross traffic with tour operators running zodiacs and kayaks out with the belugas. The port is a significant fuel re-supply depot with fuel coming north via railway and onto vessels for distribution to northern communities.

The shipping season of the port has been extended by climate change. The earlier departure of the ice is a driving the commercial incentive to extend the shipping season, to increase the number of ships for a longer period, and calls to provide ice-breaking support to further increase access to the port. Ice breaker support is a real commercial possibility for bulk commodities given freight rates further south. The Russians have offered to provide an ice breaker commercially to the port.

Mr. Drew outlined the port facilities available noting the knowledgeable work force available to expand capacity. The rail network access provides freight and passenger service, in addition to good air access and facilities that would further support port expansion. The Town of Churchill offers a municipal infrastructure with modern facilities, including a full service hospital to

respond to emergencies, RCMP and Canada Customs offices, extensive hotel capacity, and excellent communications systems.

As marine traffic increases in the region, there are some special needs:

- Ice capable salvage capabilities (necessary from an environmental response as well as marine insurance perspective)
- Increased pollution countermeasures capability (need a mock exercise to see if an offshore oil spill would be responded to appropriately; response is distance limited and weather limited to such an incident)
- Improved search and rescue capabilities; commercial expansion (in and out) and increased shipping activity to Nunavut means requirements need to be improved

The port is an integral part of Churchill infrastructure. The emergency response capacity domiciled in Churchill is important to the region and will assume increasing importance in the coming years.

Senator Willy Adams, Nunavut

Senator Adams reviewed the status and changes facing Nunavut over the 30 years it took to negotiate the Nunavut land claims agreement in 1999. With a population of approximately 30,000, 85% are Inuit. The government is comprised of a 19 member Parliament. Nunavut is a vast region and includes the water between the islands in the Arctic archipelago. An offshore agreement between Nunavut and the Government of Canada gives Canada ownership of 40% of offshore resources compared to 60% for Nunavut. The Inuit own oil and gas resources under water in their area. The Department of Fisheries and Oceans (DFO) manages marine mammals in the region. Outside the 12 nm territorial sea limit, DFO and the Canadian Coast Guard (CCG) manage offshore waters. Two offshore cold water shrimp quotas are set in offshore waters between Greenland and Canada.

Senator Adams outlined some of the development possibilities in the region including mining exploration and development and their implications. Both the Cape Dorset and Igloovik areas are particularly important for walrus harvesting and are a particular concern during winter months when increased year around shipping to service mines might impact them.

There are three management regions in Nunavut, with 25 communities and a $1 billion budget at the Nunavut government level. In addition, a $580 million trust fund from the Government of Canada was established under the land claims agreement. The $80 million interest that it generates annually funds the Nunavut Development Corporation and its activities. The land claims agreement also enhanced language and culture capability at the community level and installation of modern communications throughout the region.

Nunavut has the fastest growing population in Canada (25% increase annually). It is looking to diversify the skill level of its population and to provide training opportunities in local communities (e.g., Arctic College in Rankin Inlet), possibly including marine training. Although there is a lack of funding to support privatization of harbours (as is a problem throughout Canada) or to buy into fisheries, there are opportunities for economic development throughout the region that will expand the need for marine shipping.

Discussion

Marc Allard started the discussion by noting that it is clear that there will be development in the North and that it will affect marine shipping capacity.

Ivan Lantz, posed a question concerning the public security response capacity of the Nunavut government.

Senator Adams responded that DFO and CCG monitor the region. During the summer months, CCG monitors both shipping and fisheries. Any emergency would be dealt with through local community members and military from Newfoundland or Edmonton. The small community airlines could provide support in surveillance in search and rescue missions and some transport capacity, otherwise communities and individuals must rely on military support.

De-Brief of Emergency Simulation

Jack Gallagher reviewed the facilitated panel discussion from day before on a marine emergency situation in northern waters (a passenger vessel that gets holed and possibly causing oil leakage that moves into a search and rescue scenario).

He offered a series of observations and learnings from the exercise:

1. During the early stages of the incident, the work load of the master is large – primarily communication with various agencies. This highlights the need for procedures to manage communications, including delegating responsibilities to other shipboard personnel. Media liaison is an important task through the company rather than the ship.
2. There are differences in responding to incidents in the South and the North. In the North, response agencies are widely dispersed geographically. We need to use electronic tools, e.g., web conferencing, to share information to deal with the distances and to reduce the communications burden on the ship.
3. It is particularly important to have a single point of contact in response agencies and on board the ship, particularly as incidents transition between various government agencies' responsibilities. Services providing information need to be shared between agencies, particularly technical information related to assessing the status of the ship. Such incidents should be elevated to a higher level of management. Operational staff are, however, used to working together and are familiar with the capabilities of other agencies; more senior staff might not share this knowledge.
4. It is possible that a foreign ship might not communicate with Canadian authorities first in an emergency situation (i.e., they would communicate with their company headquarters

or flag state first). This could result in delays in triggering the Canadian emergency response system and Canadian authorities receiving necessary information.
5. The shipping company was ready to deal with passengers and their needs but they did not ask who was going to come to the rescue and when (this question needs to be asked of the Canadian government if they have triggered the emergency response system). The reluctancy to trigger the emergency response system could result in delays in getting people and equipment in place that would be critical to the successful resolution of such an incident.
6. Everyone expects time and resource delays in the North. Every SAR operation is unique. We must ask the question, Who has a clear picture of what the capabilities are across the North and how they are triggered? The shipping company has a responsibility to ensure the vessel and its passengers survive until help arrives.
7. Local communities will be stretched to deal with survivors from an emergency, e.g., provision of food, accommodation, sanitation, medical facilities, etc.
8. The capabilities of NORDREG need to be considered as the collecting and disseminating of such information can ease the communications burden during an emergency. A mandatory system would appear to be useful.
9. The strength of the shipboard team is clearly important; crew members (officers, expeditionary staff, etc.) must be prepared to step into other roles (i.e., crew depth) during an emergency situation, which would ensure survivability until help arrives (at sea and onshore).

Cdr Ken Hansen, Centre for Foreign Policy Studies

Cdr Hansen offered the outcomes of a scenario modelling exercise he developed based on the simulation exercise. In developing the game structure, rules, steps and end-game criteria, he offered five stages in the game to be modelled:

1. The ship sinks, or remains afloat until the CCG ships arrive
2. The lifeboats are launched successfully
3. The lifeboats reach the shore
4. The major aid kit is delivered by air, or not
5. Air evacuation to a local community is arranged, or not

Using the model, he outlined the outcomes (in relation to survival of the vessel and those on board) based on various scenarios. Having run the game several times, he offered some general conclusions: the probability of fatalities is 100% with a 60% probability of survival. Success was dependent upon air delivery of the survival kit and probability of the life raft getting to shore.

Cdr Hansen noted several keys to survival during such an incident:

1. Time is important – overreaction is key to survival.
2. The distance that an aircraft has to fly back and forth between the incident site and the local community landing site.

3. The speed of getting ships to the incident area.
4. The initial location of pre-positioned emergency assets.

Panel 3: The Regulatory Issues

Jim Gould, MacInnes-Cooper Legal, moderated the panel and discussion.

Peter Timonin, Transport Canada Northern

Mr. Timonin outlined the regulatory framework for Arctic shipping in Canadian waters. He noted that regulation influences ship design. While people do not like to be regulated, regulation tends to set the maximum standard for both regulators and the regulated. A streamlined regulatory system should make for better regulations. The obligation to consult widely in shipping through Canadian Marine Advisory Council (CMAC) is an important element in law, policy and regulation development in Canada. Consultation is important in creating buy-in for policy and regulations by industry. Mr. Timonin noted that, generally, regulations are not meant to deal with "what might happen". Rather, regulations are based on incidents that cause loss of life or loss of vessels; unless something has happened, it is not likely to be regulated. Compliance requires funds – for training, construction standards or equipment – and these costs and impacts must be assessed and if something is unlikely to happen it is unlikely to be regulated.

Mr. Timonin noted that regulations are prescriptive, e.g., load lines standards are full of details. Regulators now set performance standards and leave it to the ship designer to show how performance will meet that standard. In the aftermath of an incident, there is pressure from both the public and politicians to put detailed regulations in place. However, is this the best way to go? From industry point of view, performance standards that they can meet necessary; it is the regulator's job to create sound regulations so industry can function.

The inspection process for large ships works well, but smaller vessels (some 70,000 vessels) sail are outside this system. The *Canada Shipping Act 2001* (CSA 2001) gives Transport Canada the opportunity to make a change to the inspection system and to institute a Safety Management Systems (SMS) similar to ISM Code for such vessels. Participants in the SMS will ensure their own safety management system with audits or spot checks by Marine Safety. Under the SMS, vessels will need to conjure up scenarios and prove that they can deal with that scenario.

With regard to the regulatory regime for Canadian Arctic waters, CSA 2001 regulations mostly apply north of 60^{o}N and in Canadian waters. The *Arctic Waters Pollution Prevention Act* (AWPPA) regulations include provisions on ice strengthening of vessels based on types of ice.

Their lack of specificity is designed to reduce complaints by Americans and others; this is likely to be replaced by hard and fast rules. In 2010, NORDREG will become mandatory with a regular check-in time daily for all vessels. Mr. Timonin commented that SAR is easier if you know where ships are. The AWPPA will be amended to extend offshore to 200 nautical miles and the mandatory NORDREG will extend to 200 nautical miles as well.

Mr. Timonin noted that since the AWPPA came into law, technology has changed. The International Association of Classification Societies (IACS) now has a mutually recognized series of Polar Classes. After 2012, CSA 2001 regulations should be updated. After that time, attention will be directed to updating AWPPA regulations and updating ship classification regulations (design and construction standards).

Mr. Timonin concluded his remarks by noting the forthcoming publication of the Arctic Marine Shipping Assessment by the Arctic Council. The nature and volume of marine shipping in Canadian Arctic waters out to 2020 and 2050 will change (e.g., Baffinland iron mine near Pond Inlet, with 185,000 DWT ships sailing every couple of days; expansion of oil exploration in the Beaufort Sea). Transport Canada's Marine Safety will work to ensure a viable and robust regulatory framework is in place to manage this changes shipping dynamic.

David Jackson, Canadian Coast Guard

Mr. Jackson began his remarks with a brief review of the history of the Canadian Coast Guard (CCG). While the CCG has a legislative mandate, it is not a regulator. Rather the CCG provides support to Transport Canada and deals with mainly practical application. The CCG has a long history in the Arctic. Section 41 of the *Oceans Act* provides the legal basis for its authority "to provide services for safe, economical and efficient movement of ships in Canadian waters." The *Canada Shipping Act* also provides a legal basis for some elements of its mandate, i.e., maritime search and rescue (SAR), marine communications and traffic services (MCTS), and environmental response. Through the *Arctic Waters Pollution Prevention Act* and its regulations, the CCG provides support to Transport Canada through NORDREG (Arctic Canada Traffic System); AIRSS (Arctic Ice Regime Shipping System); and pollution prevention officer powers in the Arctic. The *Marine Liability Act* provides the authority for cost recovery for oil spill operations.

The CCG Arctic programs are similar to its southern roles: SAR operations and coordination through the JRCC (Joint Rescue Co-ordination Centre). CCG maintains a year around presence in the Arctic through the JRCC. Other services that the CCG also provides include ice routeing and information, marine aids to navigation, Arctic community resupply and cargo transhipment, fleet support to the Department of Fisheries and Oceans for science as well as fleet support to a variety of other government departments. Although it has no formal security role, the CCG is a major Arctic maritime player and platform provider.

Mr. Jackson outlined the operational vessels available to the CCG, including marine vessels, helicopters, and river vessels and the extent of their coverage (dispersion) as well as emergency supply caches in various communities. The CCG forms the maritime component of national the national SAR system. It is tasked as required by the JRCC (Trenton or Halifax). In addition, it participates in a Canada/United States/United Kingdom Trilateral SAR Agreement and various northern exercises.

The CCG has extensive MCTS capabilities and provides the communication backbone for incident command and control. It services are operational from mid-June through late November in the Arctic. Although its capacity has expanded, transmission issues still exist for everyone above 75^{o} North.

Environmental response equipment, as called for under the Brandon-Smith Report , have been pre-positioned in Arctic community. These packs include booms, skimmers, boats and storage tanks. Training of local people key issue and it is insufficient at this point. In addition, there are air or ship transportable depots of equipment in the Arctic that include additional pumps, water pressurizers, booms, skimmers, pumps, bladders, etc. The formalized environmental response strategy is based on the Brandon-Smith Report with an initial 72 hour response plan and various packs and cascadable resources available as necessary. Although there have been a limited number of spills in the North to date, increased vessel traffic warrants preposition of materials.

The CCG recognizes that there are several issues that warrant further attention. These include training of local populations, provision of local transportation from drop locations to incident sites – intermediate transport, and sustainability of containment/recovery operations.

The CCG expects Arctic shipping to remain in a steady state position with a gradual increase in traffic. Most shipping will continue to be south-north (re-supply) and north-south (resource extraction). An increase in cruise shipping and recreational traffic is anticipated. Climate change will result in greater variability in ice seasons in the Arctic and elsewhere. The Beaufort Sea gyre affects ice in navigation of the Northwest Passage; a smaller and more dynamic Beaufort Sea polar pack may make the Northwest Passage less navigable.

The Canadian government is engaged and responsive to the challenges facing the CCG in the Arctic. Additional funds have been committed to renewing infrastructure and vessels. The CCG conducts joint exercises with several government agencies. The government has committed to making NORDREG mandatory. Nonetheless the CCG faces a number of challenges in the future. Longer patrols in the Arctic will affect its ability to refit for service in Gulf of St. Lawrence operations (i.e., the time available to the CCG is compressed at both ends of the season); replacement of fleet and fleet mix remain an issue; there continues to be an need to improve Arctic marine charts and aids to navigation (only the Northwest Passage has been charted to modern standards and electronically). The CCG has undertaken several initiatives to address these concerns including drafting a fleet recapitalization programme, undertaking a LOS

(levels of service) review, drafting the mission profile for the new icebreaker, assumption of responsibility for two new NAVAREAs, and augmenting its environmental response capabilities.

Joe Spears, Horseshoe Bay Marine Group

Mr. Spears outlined some of the factors affecting marine emergency regulation in Canada. Canada has extensive Arctic regulatory experience with the Arctic Waters Pollution Prevention Act serving as a cornerstone for Canadian jurisdiction in the region.

Despite these preventative measures and a long history of good operations, marine incidents in Arctic are merely a subset of other shipping and marine incidents will continue to happen. In the Arctic there is additional pressure to respond to possible emergency scenarios given changes in climate, shipping patterns, etc. Response to these incidents has additional environmental overlays for operations in the Arctic. Expertise is dispersed and there is a need for coordinated lead to responses. Exercises are important in identifying weaknesses in the emergency response system.

Mr. Spears outlined some of the challenges facing responders to marine emergencies including lack of port infrastructure, access to pre-positioned emergency equipment, communications with media, lack of salvage capacity in the region, limited regulation of private vessels traveling in Arctic waters, and lack of an Arctic port of refuge policy.

During the emergency response process, private and public rights collide creating issues and gaps that need to be addressed. In particular the role of the salvage master and the on scene commander dealing with search and rescue and pollution response needs to be clarified. The interaction of the CCG and other agencies and determining who is responsible for all the activities that are happening at the same time must also be clarified. The capabilities are in place, but clear lines of communication must be established. This also means that we need to train operational staff so that they are prepared to deal with the multiple layers of an incident and access all the potential help on the ground.

Mr. Spears concluded by outlining some underlying principles for creating an Arctic regulatory regime, focussing on the need to deal with uncertainty, collection of information and enhancing communication between all stakeholders. To date Canada's Arctic response capacity has been largely untested but it is clear that there is overlapping jurisdiction and legislation and broad public interest in the region. Government agencies must work together to develop appropriate response capacity and exercise that capacity at all levels in order ensure smooth resolution of any emergency incidents in the region.

Discussion

Jim Ready asked panellists their opinions concerning commercialization of search and rescue capacity.

Mr. Timonin responded that the CCG has considered privatization of ice breaker services. Various models were looked at but rejected because private companies have not expressed an interest in taking on all the responsibilities of Transport Canada. Transport Canada has concluded that commercialization would be a false saving and not serve the public interest.

Dick Hodgson queried panellists on their perceptions of Canada's oil pollution response capacity in the Arctic, citing the *Erika* and *Prestige* incidents and the ability to respond to such incidents in the Arctic.

Mr. Timonin responded that Transport Canada is not confident of its ability to deal with an oil spill but that it has taken steps to preposition some equipment. However, there is still more work to be done. He commented that an incident would show we can respond, but probably not as well as everyone would like. The oil spill pollution prevention regime in the Arctic is more open than in the South. While it is legislated that a ship must have an arrangement with a certified "response organization" to provide oil spill response services, and an onboard oil spill response plan, in the Arctic there are no available private services and the CCG fulfills the oversight role.

Mr. Spears noted that Canada needs an Arctic place of refuge policy so that ships can be beached in the Arctic if necessary. Both private and public impacts of such a move require us to think about this issue now. The Pollution Prevention Officer has some authority in this process.

An audience member asked whether Canada can learn any lessons from the experience of Argentina and Chilean in the Antarctic region. An audience member responded by outlining the resources available in the United Kingdom, in particular the SOSREP (Secretary of States Representative for Maritime Salvage and Intervention) who is available at all times to respond to emergency incidents and assume liability for salvage operations (rather than the master).

Panel 4: The Practical Application

Michel Labrie, American Bureau of Shipping, introduced the panellists and moderated the discussion period.

Cdr Alex Grant, Commanding Officer, HMCS Toronto

Cdr Grant outlined the role and operations of the Canadian Navy in the Arctic. The Canada First Defence Strategy (May 2008) sets out the mandate for naval operations and includes two missions in the Arctic: daily domestic operations and support for civilian authorities during a crisis. Marine Security Operations Centre provides the focal point for cooperative measures with the RCMP, Canadian Coast Guard (CCG), Canadian Border Services and Transport Canada. Existing Maritime Ops Centres on the coasts provide the focal point for the Navy's operations. Cooperative arrangements are also in place with the United States Coast Guard.

The Canadian Navy provides command and control operations in marine waters, including contingency operations, defence missions, sovereignty patrols and search and rescue operations. These various scenarios are worked through during exercises within the Canadian Forces. Canadian Forces Northern serves as an emergency operations liaison in the North. Headquarters, as well as the CCG, are already part of the JRCC (Joint Rescue Co-ordination Centre) and can react quickly in an emergency operation. The JRCC, Maritime Security Operations Centre and the Admiral are all co-located, facilitating an immediate response.

Cdr Grant reviewed the current capabilities of the Navy noting that its vessels are designed to participate in joint operations. A joint exercise will be conducted in the Arctic once again this summer. This follows upon Operation Narwal 04 (a landing), Hudson Sentinel 2005 (sovereignty patrol and SAR exercise), Operation Lancaster 06 (sovereignty patrol and test multi-agency command and control exercise), and Operation Nanook 07 (multi-agency testing of surveillance and tracking and naval boarding party). Cdr Grant did note, however, that the current fleet has limited access to certain waters as vessels are not classed for entry into specific Shipping Safety Control Zones. Established under the *Arctic Waters Pollution Prevention Act* (AWPPA), the act does not provide for any exceptions for naval vessels to its provisions. A further limitation on naval operations is the range of vessels without refuelling facilities en route north. A Polar Class Arctic operational platform is, however, planned for 2014, which will include a helicopter, robust communications facilities, landing capacity for Northern Rangers and accommodation capacity for other government representatives, but no repair facilities. Additional facilities for naval vessels will be made available at Nanisivik once it has been cleaned-up and modernized.

Naval vessels are not exempt from the environmental mitigation measures under AWPPA and other regulations. The Navy has made sure it is compliant prior to going North and discharges only treated sewage, ensured that bilges are scrubbed and dried to reduce the transfer of alien species, changed menu plans to reduce garbage that needs to be disposed of at sea, and issued phosphate free soaps to all onboard personnel. Oil booms are in place onboard vessels and exercises have been conducted to use such booms during refuelling. The Navy has worked with the World Wildlife Federation in developing its environmental policies.

Although the primary mission of the Navy is not Arctic patrols, it maintains highly trained crews that can respond to the tasks put to it for Arctic operations. Although the Navy remains challenged by the lack of ice-strengthened hulls and en route refuelling capabilities, a lot of planning consideration has taken place to ensure that naval vessels can operate safely and effectively in Canadian Arctic waters.

Dr. David Petrie, Emergency Health Services Nova Scotia LifeFlight

Dr. Petrie reviewed emergency medical planning considerations for operations in remote environs such as the Arctic, focussing on the issues that arose during the simulation yesterday.

Three factors are critical in mitigating medical risk: regulations, preparations and ability of the medical team.

Planning for Arctic emergencies with mass casualties involves four phases: prevention, preparation, response, and recovery. Prevention measures include pre-clearance medicals (particularly useful for tourism operators), ensuring safe working environments, and utilizing safe ships and safe routes. Engineering can reduce the risk to passengers by ensuring that the vessel stays afloat in various emergency situations. Tourism and cruise adventurers face particular risks as individual participants might have chronic health conditions that will affect their ability to respond to emergency situations and lack of training in emergency response. Thus training (i.e., planning) of on board crew and medical staff of cruise ships in emergency medicine practices is critical. Although technology such as telemedicine can be useful in emergency situations, in reality lesser technologies might prove to be more important in assessing the need for full-scale emergency response measures from outside the vessel.

During the response phase, once again the importance of communications and the incident command system were highlighted as important planning considerations. Emergency health response falls under provincial/territorial jurisdiction and this needs to be incorporated into the onboard emergency management plan. The depth of crew training and their ability to respond to various scenarios is likewise a critical element in the successful outcome of an emergency response situation. As in the simulation exercise, on board crew and staff will likely face a multitude of traumas and injuries that require prioritization, appropriate in situ diagnosis, and a broad range of responses (e.g., stabilization, transport or medevac). Injuries will vary with the age and physical health of the passengers (e.g., one could expect different injuries on a expedition cruise vessel than on a naval vessel). Even if injured people are removed from a vessel in the Arctic, it is unclear what resources would be available for any extended period of time in remote communities. Debriefing after an incident or exercise must be integrated into the emergency planning process.

Capt. Pierre Murray, Transportation Safety Board of Canada

Capt. Murray outlined the mandate of the Transportation Safety Board (TSB), namely advancing transport safety through investigation of incidents. The TSB conducts investigations but does not assign blame or civil liability. Investigations are conducted in order to determine their causes and to prevent such incidents from occurring again. The Marine Safety unit of the TSB is small, with less than 20 staff members. The TSB has exclusive jurisdiction to investigate the cause and factors leading to an incident. The RCMP and the Department of National Defence can only do parallel investigations for their purposes. A joint investigation can be conducted if civic equipment is involved.

The TSB does conduct its investigations with the cooperation of other agencies. Thousands of small incidents occur annually. However, the TSB only conducts 3-5 full investigations each

year. This determination is based on the assessment of the risk of such an incident happening again. During a full investigation, the TSB goes back in time to see what (safety deficiencies) lead to the incident (e.g., crew training, etc.) and what happened after the incident.

In the Arctic, logistics are always an issue in conducting investigations in smaller communities. With regard to the simulation exercise yesterday, Capt. Murray noted that when an accident is reported to NORDREG, the TSB is also informed and immediately is involved. The TSB has the capacity to use a remotely operated vehicle to retrieve information in its investigations and would expect to interview the entire crew, passengers and company staff in an investigation of such an incident.

Discussion

In response to a query from Captain Angus MacDonald concerning the impact of Bill C-16 concerning migratory birds on naval operations, Cdr Grant responded that the Navy takes it environmental responsibilities very seriously. It builds time into its transit northwards to reduce speed and the chances of impacts on marine wildlife and practices deployment of booms to contain oil spills that would affect migratory marine birds.

Lt. Sid Green asked the panellists how they thought lost kayakers or small private sailing vessels should be regulated to prove their readiness to meet Arctic conditions.

Panelists replied generally that this was an issue that was difficult to resolve. Mr. Timonin noted that there is an increasing problem of adventure travelers going through the Northwest Passage. Transport Canada will provide general advice to such sailors, informing them of the information that they must have on board and the services that are available to them. Transport Canada recommends that such vessels register a sail plan with NORDREG.

Aldo Chircop, Marine and Environmental Law Institute, Dalhousie University, asked whether flag state investigations were conducted in conjunction with the Transportation Safety Board.

Capt. Murray responded that under International Maritime Organization regulations, the country that will lead an investigation will be the flag state, which might be a different state from where the incident occurred. The TSB might provide assistance to such an investigation. If the TSB is unsatisfied with a flag state report conducted outside Canada, it will conduct its own investigation. The TSB can investigate any witness under these circumstances. However, it is usually the flag state that conducts the investigation of a marine incident.

In response to an enquiry, Capt. Murray affirmed that the reports of the TSB are made available to the public on the TSB website. Overall, the trend is towards fatigue affecting human performance as a major factor in the cause of accidents.

Closing Remarks

Capt. Rodger MacDonald, International Federation of Shipmasters' Associations

Capt. MacDonald offered summary comments on the morning session of the Workshop. He noted that technology might allow us to prevent accidents in the future, overcoming the human error that is at the heart of so many marine incidents, but that this was unlikely to resolve the issue. Instead, we must focus on training, in particular mandatory ice operations skills. He suggested that if specific endorsements were necessary for operation of dynamic positioning ships and LNG carriers, we should not have a problem with requiring special endorsement for ice navigation. He also offered some suggestions on how to recruit young people to a career at sea and the opportunity presented by encouraging mid-career change opportunities for qualified individuals. He noted that many young people that have gone through the cadet programme leave the field after ten years, so we might try to recruit from that older cohort to fill in this gap.

Capt. MacDonald reiterated that hydrographic needs to support Arctic shipping. He noted that emergency response units might be insufficient but cost is a factor in providing such resources (this is also an issue in the Antarctic). Pairing or twinning of vessels might be a solution but often vessels plan to avoid each other. Mandatory reporting requirements through NORDREG are critical. Such reports should include the number of passengers aboard as well. He noted the unanswered query on how we will be able to deal with an oil spill in Arctic waters. He suggested that harmonization of regulatory regimes between polar states should be tried even though it might be difficult politically. He concluded by emphasizing that we must continue to respect the local communities in the North and ensure that marine shipping operations do not affect them detrimentally.

Capt. Philip Wake, Nautical Institute

In his summary remarks based on the afternoon session, Capt. Wake emphasized the value of the multidisciplinary nature of the Workshop and simulation exercise. He noted that in an emergency situation, it is important that respondents are already familiar with each other and that there was a clear need to practice emergency procedures. He noted gaps in the Canadian emergency response system, particularly with regards to the role of the on scene commander and suggested that the SOSREP model used by the United Kingdom might be something that Canada would like to consider adopting.

Capt. Wake noted the valuable role that the Company of Master Mariners can play in facilitating individuals with each other and the emergency procedures and capabilities that are available in the Canadian Arctic. He concluded by noting that training of the next generation of ice navigators is important. The transfer of knowledge from the current generation of navigators to the next generation is a role that the Nautical Institute intends to fulfill and that further meetings in Canada in 2011 will be a step in that process.

Capt. Jim Calvesbert closed the Workshop with acknowledgement of the contribution and organizational support provided by Ms. Becky Field, Marine Affairs Programme, Dalhousie

University, and recognition of the members of the organizing committee and sponsors of the Workshop and simulation exercise.

Issue

(1) Shipping intelligence in the Arctic region is needed for safety and security reasons. In support of this, the provision of information to NORDREG, a vessel information system, will become mandatory for all vessels entering Arctic regions and this information must be disseminated to all government organizations providing support services.
(2) There will be a delay in any Search and Rescue (SAR) response in Arctic regions due to the geographical distances from support centres. For this reason, Canada must institute a requirement for mandatory survival equipment sufficient for all on board, including survival suits, Arctic shelters, heating sources, radio equipment, damage control materials, etc., to be carried on board vessels trading in Arctic regions.
(3) The Arctic Waters Pollution Prevention Act, in place since the 1970's, must be updated and aligned with revised IMO Guidelines for Ships Operating in Ice-covered Waters.
(4) Officers navigating ships in polar regions should be trained, examined, and certificated in ice navigation and ice seamanship. This certification should be internationally accepted and part of the STCW requirements. As trained ice navigators are essential components of the Arctic Ice Regime Shipping System, Canada should take a lead role in the development and implementation of the standards.
(5) Crew members of ships trading into polar regions should be required to have training in the use of emergency equipment in very low temperatures, in cold climate survival, and in damage control training leading to becoming an STCW requirement.
(6) Adequate funding should be provided to the Canadian Hydrographic Service (CHS) to accelerate the up-dating of charts and hydrographic data for the Canadian Arctic area.
(7) Scientific research should be funded in the area of response to oil and chemical spills in ice-infested waters.

(8) Shipping companies, federal government marine agencies, and the various Northern governments should liaise on emergency response and periodically perform exercises to improve their response capability.

(9) Certain Canadian shipping companies have an excellent record in Arctic operations and should be invited to participate with the Canadian government and other Arctic states in the preparation for an increase in polar shipping by non-traditional shipping companies and seafarers.

(10) The Canadian government must recognize the increased risks posed by the commercial use of Arctic waters during a longer season as well as increased numbers of users and provide capable resources to support SAR and emergency services.

(11) Canada must address the issue of pollution response services in the Arctic. This is currently the responsibility of the Canadian Coast Guard (CCG) in areas north of 60 degrees latitude. In southern areas, there is a Response Organization (RO) structure. Either CCG capability must be increased or a similar RO system must be established for Arctic regions.

(12) Local communities should be provided with emergency response equipment caches and given training for immediate response while awaiting primary support units.

(13) Vessels in Arctic regions must subscribe to a system similar to the Lloyds Register Ship Emergency Response System (SERS) in order to have critical technical information on everything from damage stability and residual longitudinal strength to the effects of grounding or oil outflow being available to emergency response organizations.

(14) Immediate action is required to fund the replacement of Coast Guard major icebreakers and to design and construct year-round Arctic icebreakers with the capability of accommodating other government department operations on an as- needed basis. Coast Guard capacity and funding must recognize that the summer Arctic and winter Gulf seasons now overlap.

(15) Immediate consideration and designation of places of refuge in the Arctic is required to support potential increases in Arctic shipping.