



Seule la version électronique est disponible

TP 743E
(12/2014)

TERMPOL REVIEW PROCESS

2014 EDITION
DECEMBER 2014



<p>Responsible Authority</p> <p>The Director, Navigation Safety and Environmental Programs, is responsible for this document, including any change, correction, or update.</p>	<p>Approval</p> <hr/> <hr/> <p>Director, Navigation Safety and Environmental Programs Marine Safety</p> <p>Date signed: _____</p>
---	---

Original Date Issued: February 1977

Date Revised: December 2014

© Her Majesty the Queen in Right of Canada, as represented by the Minister of Transport, 2014.

Permission is granted, by Transport Canada, to copy this TP 743E as required. While use of this material has been authorized, Transport Canada shall not be responsible for the manner in which the information is presented, nor for any interpretations thereof. This TP 743E may not be updated to reflect amendments made to the original content. For up-to-date information, contact Transport Canada.

TP 743E
(12/2014)

DOCUMENT INFORMATION				
Title	TERMPOL Review Process			
TP No.	743E	Edition	2014	RDIMS #8594681
Catalogue No.	T29-120/2014E-PDF	ISBN	978-1-100-25495-1	
Originator	Director, Navigation Safety and Environmental Programs Tower C, Place de Ville 330 Sparks Street, 10th Floor Ottawa, Ontario K1A 0N8	Telephone	1-855-859-3123 (Toll Free)	
		Fax	613-993-8196	
		E-mail	marinesafety-securitemaritime@tc.gc.ca	
		URL	http://www.tc.gc.ca/marinesafety/	

REVISIONS				
Last Review		12/2014		
Next Review				
Revision No.	Date of Issue	Affected Pages	Author(s)	Brief Description of Change
1	02/1977			1st Edition
2	10/1983			2nd Edition
3	01/2001			3rd Edition
4	12/2014			4th Edition

BACKGROUND

The TERMPOL process has been in existence since the late 1970s. An interdepartmental committee reviewing marine pollution issues identified the need for a way to assess the navigational risks associated with the location and operation of marine terminals for large oil tankers. This led to the publication of the first edition of the TERMPOL Code in 1977. Representatives from federal departments and authorities contributed to the content of the Code.

In 1982, after the successful completion of a number of TERMPOL assessments, an interdepartmental committee confirmed a need for a second edition of the TERMPOL Code, expanded to include proposals for marine terminals designed to handle bulk shipments of liquefied natural gas (LNG), liquefied petroleum gas (LPG), and chemicals.

When the *Canadian Environmental Assessment Act* entered into force in 1995, parts of the existing Code became irrelevant. Transport Canada issued a third edition in 2001 that covered operational safety aspects of dedicated vessels transporting pollutants or hazardous and noxious substances in bulk.

Following program and regulatory changes, as well as a growing public interest in the TERMPOL process, Transport Canada revised the manual in 2014 to:

- clarify the scope and intent of TERMPOL, focusing on navigation safety and marine pollution prevention. The scope of TERMPOL does not extend to the potential environmental effects of a project.
- encourage proponents to engage local waterway users, particularly Aboriginal groups, in the preparation of the surveys and studies.
- update and clarify the text and TERMPOL process where needed.

Transport Canada prepared this 2014 edition in consultation with Canadian Coast Guard, Environment Canada, Fisheries and Oceans Canada, NRCan and pilotage authorities.

TERMPOL REVIEW PROCESS: DEFINITIONS & ACRONYMS

DEFINITIONS

DESIGN VESSEL(S):	The class or classes of vessel the proponent intends to use to ship cargo of the nature contemplated by the TERMPOL Review Process, or the prototype of the vessels the proponents expects to use at proposed marine terminals or transshipment sites.
MARINE TRAFFIC NETWORK:	A network of marine traffic that comprises various types of vessels engaged in different operations, using the various waterways that provide access to and from marine terminals or transshipment sites located in waters under Canadian jurisdiction.
PROJECT:	A marine terminal or transshipment site that a proponent proposes to construct, modify or recommission.
PROPONENT:	Person, company or group that proposes to construct, modify or recommission a marine terminal or transshipment site.
WATERS UNDER CANADIAN JURISDICTION	Canadian waters and the waters in the exclusive economic zone of Canada.

ACRONYMS

CCG	Canadian Coast Guard
CEAA	<i>Canadian Environmental Assessment Act</i>
DFO	Department of Fisheries and Oceans
IMO	International Maritime Organization
ISGOTT	International Safety Guide for Oil Tankers & Terminals
LBP	Length Between Perpendiculars
LOA	Length Overall
LNG	Liquefied Natural Gas
LPG	Liquefied Petroleum Gas
NPA	<i>Navigation Protection Act</i>
OCIMF	Oil Companies International Marine Forum
OHF	Oil Handling Facility
PIANC	Permanent International Association of Navigation Congresses
PIB	Port Information Book
RD	Regional Director
SIGTTO	Society of International Gas Tanker and Terminal Operators
SPM	Single Point Mooring
TCMSS	Transport Canada Marine Safety and Security
TOM	Terminal / Transshipment Site Operations Manual
TRC	TERMPOL Review Committee
TRP	TERMPOL Review Process
TRR	TERMPOL Review Report

TABLE OF CONTENTS

BACKGROUND.....	II
TERMPOL REVIEW PROCESS: DEFINITIONS & ACRONYMS.....	III
DEFINITIONS.....	iii
ACRONYMS.....	iv
PART 1.....	1
1. APPLICATION & INTENT OF THE TERMPOL REVIEW PROCESS.....	1
1.1 INTRODUCTION.....	1
1.2 TRP EXCLUSIONS & OVERLAPS.....	2
1.3 RATIONALE FOR THE TRP.....	3
1.4 STATUS OF THE TRP.....	4
1.5 PROPONENT’S PARTICIPATION.....	5
1.6 OVERVIEW OF THE TERMPOL REVIEW PROCESS.....	5
PART 2.....	8
2. TERMPOL REVIEW COMMITTEE (TRC).....	8
2.1 INTRODUCTION.....	8
2.2 CHAIRPERSON - TERMPOL REVIEW COMMITTEE.....	9
2.3 COMMITTEE RESPONSIBILITY.....	9
2.4 SCOPING CONSIDERATIONS.....	9
2.5 COMMITTEE REPORT.....	10
PART 3.....	12
3. TERMPOL SURVEYS & STUDIES.....	12
3.1 INTRODUCTION.....	12
3.2 MARINE TRAFFIC SURVEY.....	13
3.3 ROUTE ANALYSIS, APPROACH CHARACTERISTICS & NAVIGABILITY SURVEY.....	15
3.4 SPECIAL UNDERKEEL CLEARANCE SURVEY.....	16
3.5 TRANSIT TIME AND DELAY SURVEY.....	17
3.6 CASUALTY DATA SURVEY.....	18
3.7 VESSEL SPECIFICATIONS.....	18
3.8 SITE PLANS & TECHNICAL DATA.....	19
3.9 CARGO TRANSFER & TRANSSHIPMENT SYSTEMS.....	21
3.10 CHANNEL, MANEUVERING & ANCHORAGE ELEMENTS.....	23
3.11 BERTH PROCEDURES & PROVISIONS.....	23

3.12	SINGLE POINT MOORING PROVISIONS & PROCEDURES	25
3.13	GENERAL RISK ANALYSIS & INTENDED METHODS OF REDUCING RISKS ...	25
3.14	PORT INFORMATION BOOK.....	30
3.15	TERMINAL OPERATIONS MANUAL.....	31
3.16	CONTINGENCY PLANNING	31
3.17	OIL HANDLING FACILITIES REQUIREMENTS	33
3.18	HAZARDOUS & NOXIOUS SUBSTANCES CONSIDERATIONS	35
APPENDIX 1: List of Sources of Information.....		36
APPENDIX 2: Recommended Approach to Aboriginal Engagement.....		37
APPENDIX 3: Single Point Mooring Guidelines.....		38

PART 1

1. APPLICATION & INTENT OF THE TERMPOL REVIEW PROCESS

1.1 INTRODUCTION

1.1.1 The “TERMPOL Review Process” (TRP) is a technical review of marine terminal systems and transshipment sites. The TRP focuses on:

- a design vessel’s selected route in waters under Canadian jurisdiction to its berth at a proposed marine terminal or transshipment site; and
- the process of cargo handling between vessels, or off-loading from vessel to shore or vice-versa including single point mooring facilities.

The TRP applies to:

- proposed marine terminal systems and transshipment sites for bulk oil, chemical, liquefied gas and any other cargoes Transport Canada Marine Safety and Security (TCMSS) believes may pose a marine transportation safety issue, a risk to public safety or the marine environment; and
- existing marine terminal systems or designated transshipment sites for these substances when proposed changes would significantly change their marine operations.

1.1.2 The TRP defines a marine terminal system as the vessel’s berth, its approaches from seaward, its cargo handling equipment and related port or terminal infrastructures. The TRP defines a transshipment site as a designated location for the transfer of cargo between vessels.

1.1.3 The intent of the TRP is to improve, where possible, those elements of a proposal which could, in certain circumstances, threaten the integrity of the vessel’s hull and its cargo containment system while navigating in waters under Canadian jurisdiction. The TRP also applies the same considerations to cargo transfer operations both alongside the proposed terminal and at any designated transshipment site. The TRP is applicable to operational safety measures intended to address site-specific circumstances and those along the associated navigational route(s).

1.1.4 In conducting a TERMPOL Review, the proponent should demonstrate through its surveys and studies that it has:

- identified major accident hazards in the context of the proposed operation;
- evaluated the risks from these hazards; and

- identified and evaluated measures to reduce those risks to an acceptable level using the best available technology.

1.2 TRP EXCLUSIONS & OVERLAPS

1.2.1 While the TRP is not intended to assess the terminal's land based shore installations, hinterland cargo handling or storage facilities, it does address those aspects of the terminal's operation and associated contingency planning that apply to the design vessels using the terminal, from an inter-dependent safety perspective.

1.2.2 The TRP does not prescribe detailed standards for the marine terminal site, design, construction and operation.

1.2.3 The TRP is a stand-alone process, separate from any environmental impact assessment. It does not examine potential environmental effects that may result from the project, including those caused by accidents and malfunctions and cumulative environmental effects. Where a regulatory process such as those under the Canadian Environmental Agency, the National Energy Board or provincial authorities applies to the project, the TERMPOL Review Committee (TRC) expects the proponent to:

- consider how the TERMPOL review can help to inform that review process and to align timelines if possible and as appropriate; and
- provide its submission, or submissions, to the lead authority and the public, including all correspondence with the TRC related to TERMPOL review, according to the filing and timing requirements of that regulatory process.

1.2.4 Transport Canada's Navigation Protection Program administers the *Navigation Protection Act* (NPA) requirements through a separate process. The NPA authorizes and regulates works and obstructions that risk interfering with navigation in the navigable waters listed in the schedule to the Act. For the purposes of the NPA, a work is any human-made structure, device or thing—temporary or permanent—that is in, on, over, under, through or across any navigable water.

The Navigation Protection Program reviews and authorizes works in navigable waters. This review process includes an evaluation of risks impacting navigation created by the "work itself." In contrast, the TRP focuses on vessel and navigation safety of the marine transportation components within the scope of the proposed project.

1.3 RATIONALE FOR THE TRP

1.3.1 The construction and operation of a new, modified, or recommissioned marine terminal system or transshipment site introduces changes in regional shipping activity. Vessels carrying cargoes such as oil, chemicals and liquefied gases may also pose a threat to the environment or to the safety of the communities along the proposed route(s) to and from the terminal or transshipment site. It is those potential changes and threats to safety that are being reviewed and considered under the TRP.

1.3.2 The proponent must consider a range of subjects such as, but not limited to:

- the possible effects of increased shipping activity on existing regional shipping networks including fishing and recreational activities;
- concerns related to pollutant cargoes carried by the additional vessels;
- risks to communities along the route to the terminal or transshipment site;
- the navigational safety of the vessel route(s);
- the services available to facilitate safe navigation such as fixed and floating aids, vessel traffic services, offshore electronic position fixing systems, requirements for pilotage, tug escort and radiocommunications along the vessel route(s);
- the suitability of the design vessel to navigate the proposed route(s) and docking at the design vessel's berth;
- the operational safety of the design vessel's cargo containment and handling systems;
- the adequacy of the design vessel's berth and related terminal service requirements;
- pollution prevention measures; and
- marine contingency planning and related emergency counter-measures.

1.3.3 The TERMPOL Review Process objectively appraises operational vessel safety, route safety and cargo transfer operations associated with the proposed marine terminal system or transshipment site. As such, the TRP is designed to help the proponent to assess the risks that could be incurred, identify any potential problems and identify opportunities for improvement to enhance marine safety.

1.3.4 The TERMPOL publication provides guidance to proponents as to what information should be considered in planning their proposed project. The studies and surveys help proponents to assess and demonstrate how they can carry out the marine transportation components of the project safely, taking into account the current Canadian legislative and regulatory framework, industry best practices, marine programs and services.

1.3.5 The TRP is a voluntary process that allows proponents to have a TRC assess the marine transportation components of their project at an early stage of the

proposed project. The TRC is composed of relevant departments and authorities with marine regulatory, programs and services responsibilities. Upon completion, the committee will provide a report on their review of the proponent's submission concerning the navigation safety and marine pollution prevention elements of the project, with technical feedback from the perspectives of Committee members who are subject matter experts of the key departments and authorities involved.

1.4 STATUS OF THE TRP

1.4.1 The TRP is not a regulatory instrument; its provisions, therefore, are not mandatory. There are no approvals or permits issued as a result of the TERMPOL Review Process. However, government authorities and other agencies can use a TERMPOL Review Committee's work and report to identify:

- potential problems and opportunities for improvements to enhance marine safety, and
- the impact, if any, on marine services and programs.

For example, opportunities for improvements could lead to the development of recommended measures, guidelines, an industry best practice, standards, the consideration of a review of marine services and programs or a regulatory review.

1.4.2 No one should interpret any TERMPOL Review Committee report as a statement of government policy, or assume that the government endorses the report in whole, or in part. The report reflects only the views of the departmental representatives who reviewed the proposal and prepared the report. Consequently, the TERMPOL review report conclusions and recommendations are not binding on any department, authority, group or individual. Departmental executives or the proponent may, however, act on any recommendation, as appropriate.

1.4.3 TERMPOL report conclusions and recommendations do not relieve a proponent and the vessel(s) associated with the project from an obligation to fully comply with all current legislative and regulatory requirements, amended from time to time, that apply to shipping safety and to the protection of the environment. These Acts include but are not limited to:

- the *Canada Shipping Act, 2001*;
- the *Arctic Waters Pollution Prevention Act*;
- the *Fisheries Act*;
- the *Oceans Act*;
- the *Canada Marine Act*;
- the *Marine Transportation Security Act*;

- the *Marine Liability Act*;
- the *Pilotage Act*;
- the *Navigation Protection Act*; and
- the *Canadian Environmental Assessment Act, 2012*.

1.4.5 TCMSS publishes and coordinates the TERMPOL Review Process. Each participating department involved in the review provides its contributions and makes its recommendations as per its own particular area of expertise.

1.5 PROPONENT'S PARTICIPATION

1.5.1 The success of the TRP depends largely upon the proponent's submission and the quality of the data and analysis submitted to the TERMPOL Review Committee conducting the review. The proponent is responsible for ensuring that the surveys and studies meet the highest industry and international standards.

1.5.2 The TRC is not necessarily limited to the data supplied by the proponent. Departmental databases or other sources of information may enable the TRC to verify much of the substance of the proponent's submission and to identify potential problems.

1.6 OVERVIEW OF THE TERMPOL REVIEW PROCESS

1.6.1 The TRP begins when the proponent submits a request for a review, in writing, to the appropriate Regional Director (RD) of TCMSS.

1.6.2 After the proponent formally requests a TERMPOL review, TCMSS will assess the request to determine if it will conduct a TRP (i.e. resources, applicability, necessity, timing, information already available). If the TRP is to proceed, the RD of TCMSS appoints a chairperson.

1.6.3 The chairperson convenes a TRC with representatives from departments and authorities with expertise or responsibilities relevant to the project.

1.6.4 Representatives of the TRC and the proponent should meet soon after the Committee is convened to:

- agree on the surveys and studies for the particular TRP and their scope;
- establish administrative lines of communication between the TRC and the proponent's representatives;
- agree on a schedule of periodic progress meetings; and
- inform the proponent's representatives of federal databases and other information resources available to it.

- 1.6.5 The proponent and TC may enter into an agreement for services related to the TERMPOL Review, including terms and conditions surrounding the review and monetary considerations.
- 1.6.6 The TRC Chairperson will specify the conditions for printed and electronic copies of the proponent's submission.
- 1.6.7 During the TERMPOL Review Process, the TRC may identify information gaps, or it may require amplification of data provided by the proponent. Requests of this nature will be directed to the proponent's representatives using the administrative procedures agreed upon during the initial meeting.
- 1.6.8 Upon completion, Transport Canada will make the TERMPOL Review Report available in both official languages to the public. At the same time, to fully understand the basis of the TERMPOL Review Report and provide the complete background, the TRC expects the proponent to make its submission or submissions available to the public through its website or other means.

Figure 1 provides an example of the general stages that a TRC would follow. Part 2 of the TRP describes the composition and operation of the TRC in greater detail. Part 3 describes the various surveys and studies the TRC may request for the review.

STAGE	ACTIVITY
1. TCMSS convenes a TERMPOL Review Committee (TRC).	1.1 Initial review of proposed project outline.
	1.2 Initial discussion of surveys and studies required.
	1.3 Identify departmental resources available.
2. TRC meets with proponent/ proponent’s representatives.	2.1 Agree on scope and depth of surveys and studies required.
	2.2 Inform proponent / proponent’s representatives of departmental information resources available.
	2.3 Agree on format of proponent’s submission.
	2.4 Establish administrative lines of communication.
	2.5 Agree on schedule of progress meetings (if necessary).
	2.6 TRC may enter into a TERMPOL Agreement with the proponent.
3. Proponent prepares TERMPOL surveys and studies	3.1 Proponent prepares the TERMPOL surveys and studies.
	3.2 TRC Chairperson receives proponent’s submission and distributes it to TRC.
4. TRC begins review process.	4.1 TRC identifies need for additional information or amplification of information provided.
	4.2 TRC meets with proponent’s representatives (if necessary).
	4.3 TRC may seek expert advice on matters raised in proponent’s submission.
5. TRC submits final draft report	5.1 TRC submits final draft report to the RD, who forwards it to the Director General TCMSS.
	5.2 Director General TCMSS approves TRC Report for publication with authorities from other departments.
6. Director General TCMSS forwards report to proponent.	6.1 Director General TCMSS forwards the TERMPOL Review Report to the proponent.

Figure 1: Stages of the TERMPOL Review Committee (TRC)

PART 2

2. TERMPOL REVIEW COMMITTEE (TRC)

2.1 INTRODUCTION

2.1.1 The TRC may include representatives from :

- Transport Canada (marine safety, marine pollution prevention, preparedness and response);
- Canadian Coast Guard (marine navigation, preparedness and response);
- Canadian Hydrographic Service, DFO;
- pilotage authorities; and
- port authorities, when the proposed project is in a port administered under the *Canada Marine Act*.

2.1.2 Depending on the geographical location of the proposed marine terminal system or transshipment site and the nature of the cargo, it may be appropriate to invite representatives of other departments and authorities with marine regulatory, programs and services responsibilities to participate on the TRC. These may include:

- Environment Canada;
- Public Works and Government Services Canada;
- Natural Resources Canada;
- Aboriginal Affairs and Northern Development Canada;
- St. Lawrence Seaway Management Corporation, when the proposed terminal is located within the Seaway region;
- provincial Department of the Environment; or
- any other department, authority or organization, depending on the circumstances under consideration.

2.1.3 When public safety is considered to be an issue from the accidental release of cargo, it may be appropriate to include representatives from provincial departments or entities such as emergency measures organizations.

2.1.4 The TRC may invite a subject matter expert to inform them on a particular subject, if needed.

2.1.5 If sailing to the Great Lakes or entering certain Canadian coastal ports involves a transit through waters not under Canadian jurisdiction, the proponent should contact the appropriate Administration for any additional requirements that may affect the transit of their vessels.

2.2 CHAIRPERSON - TERMPOL REVIEW COMMITTEE

2.2.1 The Chairperson would normally be concerned with the:

- nature of the proposal;
- provisions of the review process;
- constitution of the Committee; and
- administration of the review process.

2.2.2 The Chairperson is generally assisted by a committee secretary provided by TCMSS. The remaining members of the TRC are selected by the executives of the appropriate participating departments or authorities based on the project proposal.

2.2.3 One or more representatives from TCMSS Headquarters or from other relevant departments may, at the request of the chairperson, assist in the review process relating to the technical subjects under consideration.

2.3 COMMITTEE RESPONSIBILITY

2.3.1 The TRC carries out the review of the project proposal. The primary responsibilities of the members of the TRC are to:

- help determine the appropriate scope of the TRP (see 2.4) and the list of surveys and studies needed to support the TRP (see Part 3);
- review the proponent's submission;
- determine if there are information gaps or areas requiring greater detail and indicate to the TRC chairperson any additional information they may need from the proponent;
- advise the TRC chairperson of the various departments' perspectives and, when applicable, departmental policies relating to the TRP;
- assist the TRC chairperson in producing the interim and final reports or Executive Summary as required; and
- inform their respective departments or authorities on the review process.

2.4 SCOPING CONSIDERATIONS

2.4.1 The scope of the TRP may vary according to the nature and location of the proposed project, as each review process is designed to address the particular circumstances of the project. Some considerations affecting the scope of the TRP may include geographical area, the relevant surveys and studies, and elements within those surveys and studies. Other considerations could be:

- Is the project a terminal handling bulk oil, chemical, LNG or other hazardous cargoes?
- Is the project a new terminal?
- Is the project proposed for an area that is not already a well-established shipping route?

- Are the vessels proposed for the project larger than vessels currently calling in the area?
- Is this a new cargo, not currently shipped out of the area?
- Is the project located outside the boundaries of a Canada Port Authority?
- Is this the first TRP conducted in the region?
- Are the operations, vessels and/or cargo different from the previous TRP(s) in the region?
- Is the proposed increase in traffic substantial?

2.4.2 The TRC will look to the proponent to propose an appropriate scope, with rationale, that takes into account the considerations above. The TRC may agree with the proposed scope or may propose modifications.

Note: The proponent should not begin the studies and surveys until it has received confirmation from the TRC on the scope.

2.4.3 Although the TRC will develop the specific list of surveys and studies needed for each review, topic areas are likely to include:

- vessel design and operation;
- navigational and physical characteristics of the transit routes and approaches to the terminal;
- general overview of the terminal;
- cargo transfer;
- risk and accident analysis along the transit route and at the terminal and related mitigating measures;
- pollution prevention measures; and
- contingency plan(s).

2.5 COMMITTEE REPORT

2.5.1 The TRC will determine the format, substance, and number of copies of the final report.

2.5.2 When the TRP is complete, the TRC normally submits the report to the RD, who forwards it to the Director General of TCMSS and to representatives of the participating departments or authorities. This report will include:

- an Executive Summary stating interdepartmental participation, conclusions, findings and recommendations; and
- reports on specific topics that were identified as necessary to the review and prepared as part of the TRP.

2.5.3 Senior managers of all the participating departments and authorities represented on the TRC will review and approve the TERMPOL Report before TCMSS forwards it to the proponent.

2.5.4 TCMSS will forward copies of the final report to the participating departments for archiving.

PART 3

3. TERMPOL SURVEYS & STUDIES

3.1 INTRODUCTION

- 3.1.1 In order to develop optimally safe vessel operational criteria and a pollution prevention program, the planning of a new, recommissioned or modified marine terminal or establishment of a transshipment site to serve oil tankers, liquefied gas, or chemical carriers will require the compilation and analysis of diverse data sets. The presentation of the material should be in a form that the TRC can easily use.
- 3.1.2 The proponent may obtain the statistical and other data sets necessary for the studies and surveys identified in this Part from a number of sources, some of which are identified in the respective sections. Proponents should use their own judgment in selecting sources of required data and the best application of those data, keeping in mind that the TRC may request more information on any topic. In some circumstances the proponent may need to compile primary data, rather than relying on existing information, on a specific topic in relation to the proposed site.
- 3.1.3 In addition to verifying compliance with all applicable marine safety regulations, the surveys and studies should identify and take into account applicable standards, procedures, codes, recommendations and best practices recognized by various international authorities and associations. See Appendix 1 for a list of some of the main organizations and associations. References have also been made to specific standards and guidelines in some of the following surveys and studies.
- 3.1.4 The proponent is encouraged to establish early informal contact with the relevant federal, provincial and territorial authorities to gain access to pertinent data, policies and guidelines. The surveys, studies and technical data, which are amplified in the sections that follow, include:
- Marine Traffic Survey;
 - Route Analysis, Approach Characteristics and Navigability Survey;
 - Special Underkeel Clearance Survey;
 - Transit Time and Delay Survey;
 - Casualty Data Survey;
 - Vessel Specifications;
 - Site Plans and Technical Data;
 - Cargo Transfer and Transshipment Systems;
 - Channel, Manoeuvring and Anchorage Elements;
 - Berth Procedures and Provisions;

- Single Point Mooring Provisions and Procedures;
 - General Risk Analysis and Intended Methods of Reducing Risks;
 - Port Information Book;
 - Terminal Operations Manual;
 - Contingency Planning;
 - Oil Handling Facilities Requirements; and
 - Hazardous and Noxious Substances Considerations.
- 3.1.5 Proponents are encouraged to engage local waterway users such as fishing associations, recreational users, community associations and Aboriginal groups early in the TRP when conducting surveys and studies.
- 3.1.6 Transport Canada especially recommends Aboriginal engagement. The surveys and studies may deal with subject matters of interest to Aboriginal groups with local and traditional knowledge that could enhance the technical assessment of marine safety. Appendix 2 explains Transport Canada's recommended approach to Aboriginal engagement in a TERMPOL review.

3.2 MARINE TRAFFIC SURVEY

- 3.2.1 The objectives of this survey are to quantify and describe all recreational, commercial and any other traffic movement that collectively form the regional marine traffic network. For this survey the proponent must identify:
- details about the types and sizes of vessels operating in the region, particularly those the design vessel will likely encounter en route to and from the proposed terminal or transshipment site;
 - variations in traffic density statistics including those projected as a result of the proponent's vessels;
 - special operational area and details (naval and airborne exercise areas, offshore exploration and exploitation activities and seaplane activities);
 - network focal point, or nodes, which indicate the geographical locations where close-quarter situations are likely to occur and, particularly, where there is crossing traffic;
 - major fishing grounds, type of fishing, routes and the periods they are used by fishermen;
 - major traffic routes including seasonal variations attributable to climatic influences or other causes;
 - sensitive biological and human environments along or adjacent to the proposed routes;
 - marine areas designated under various jurisdictions;
 - coastal communities close to the intended route; and
 - possible alternative routes for the design vessel in light of the above information and assessment of the experience of similar vessels travelling in the same or similar areas.

- 3.2.2 Possible sources of statistical data can include the Canadian Coast Guard's Marine Communications and Traffic Services records, the relevant port authority, if applicable, the Department of Fisheries and Oceans, Statistics Canada, ferry schedules, Pilotage authority, local marine associations, municipal records, and consultants' reports.
- 3.2.3 This survey may help the proponent to assess which of the possible shipping routes offers the greatest navigational safety, minimizing potential risk of an incident.
- 3.2.4 A marine traffic network consists of one or more finite capacity waterways leading to various marine terminals located in coastal zones or inland waters. The flow of traffic within the network may be classified as:
- predictable flows of regular or predictable vessel transits; and
 - unpredictable flows of unscheduled or random vessel transits.

Statistical counts of regional traffic for a particular coastal region's marine network over specified periods may be available. Other marine activities often superimposed on the regional traffic patterns could include:

- seasonal and year-round fishing activities;
- military exercises;
- recreational boating and sailing activities;
- seasonal cruise expeditions;
- offshore exploration and exploitation activities;
- ferry routes and schedules;
- seaplane activities; and
- winter activities.

Counts and supplementary data related to the above can be obtained from a variety of sources, including several federal departments.

- 3.2.5 The shipping component of the proponent's proposal will add to the observed or estimated vessel counts in some of the ship channels and coastal routes within the existing regional network. The additions can be estimated by considering both the proposed annual loading or receiving throughput for the proposed marine terminal and the mix of design vessels in terms of the minimum number of voyages per year required to meet the proposed annual throughput volume. As the proposed marine terminal may either be an importing or an exporting terminal, the estimated additional vessel counts (voyages) should include an estimation of the incremental numbers required to transship cargo to and from the terminal.

- 3.2.6 All of the considerations noted will apply to any proposed transshipment site along with the fact that any such designated site may limit the capacity of the waterway to handle traffic flow by reserving a portion of the area for the site.
- 3.2.7 The survey should also include a section that focuses specifically on the local marine traffic in the immediate geographical area of the proposed marine terminal. The proponent should identify:
- the types and sizes of vessels in the area of the terminal;
 - the types and quantities of potential hazardous cargo
 - local fishing operations;
 - local recreational and other marine activities;
 - nearby residential and commercial areas; and
 - routing traffic support services in the terminal area and approaches.

3.3 ROUTE ANALYSIS, APPROACH CHARACTERISTICS & NAVIGABILITY SURVEY

- 3.3.1 The objectives of this survey are for the proponent to assess vessel and route safety, therefore this is a major component of the review. The survey should be considered in terms of the design vessel's applicable characteristics, the physical characteristics of the approach route to the terminal or transshipment site and prevailing atmospheric factors.

Proponents are responsible for demonstrating, through simulation or other means, the suitability of the routes for the safe navigation of the design vessels and any supporting vessels, taking into account malfunctions and emergency manoeuvres. They must confirm that the loaded design vessel can safely navigate the channel, or channels, between the proposed marine terminal or transshipment site and its coastal approaches, or vice versa. They must also identify:

- hydrographic factors that could adversely affect the safety of the design vessel (e.g., tides);
- the suitability, if any, of alternative routes to the proposed marine terminal or transshipment site;
- any climatic or oceanographic factors that adversely affect navigational safety;
- any navigational hazards or vessel manoeuvring problems along the route;
- any physical limitations along the route (e.g., bridges, power transmission lines, narrows, bars, etc.);
- opportunities for improvements to existing aids to navigation or vessel traffic services;
- the need for pilotage and pilotage availability;
- the need, if any, for escort /assist tugs;

- the geographical locations of suitable emergency and holding anchorages for the design vessel; and
- supplemental, but significant, matters such as the geographical location of the pilot station, the regional radiocommunications infrastructure, ice conditions and ice strengthening requirements, and any other relevant matters of interest to the proponent or the TRC.

3.3.2 Data sources for the Route Analysis, Approach Characteristics and Navigability Survey include:

- applicable nautical charts, such as those listed in the annual edition of the Canadian *Notices to Mariners*, and other required nautical publications it cites, including:
 - radio aids to marine navigation,
 - sailing directions,
 - list of lights, buoys and fog signals,
 - tide and current tables,
 - atlas of tidal currents, and
 - Canadian aids to navigation system
- Fisheries and Oceans Canada for oceanographic data;
- Environment Canada for climatic data, including ice and iceberg information;
- Pilotage Authorities; and
- consultants' reports.

3.3.3 The annual edition of the Canadian *Notices to Mariners* provides information on various other initiatives that may affect the safety of the vessel, as well.

3.4 SPECIAL UNDERKEEL CLEARANCE SURVEY

3.4.1 In this survey the proponent must consider all relevant factors that may affect underkeel clearance, as well as demonstrate and ensure that the design vessel has an adequate underkeel clearance at all times.

3.4.2 The design vessel's minimum underkeel clearance should be fifteen percent of its maximum permissible draught in sheltered waters (after considering squat and other factors) or meet the requirements established and published by the appropriate government authority for a specific waterway. The TRC will consider a proposal for a minimum underkeel clearance of less than fifteen percent of the design vessel's deepest draught in the approach, but the proposal should be supported by explicit operational details and calculations associated with each of the following factors:

- minimum chart datum measurements supplemented with tidal heights over a specified time base;

- the accuracy of predicted tidal heights and the predicted times of high water and low water;
- details of any tidal surges and wind set-up;
- the allowances made for the degree of accuracy in the hydrographic survey (chart datum) and for dredging tolerances;
- the incidence and degree of channel silting between maintenance dredgings and the identification of all critical depth areas;
- the increase in effective draught due to the rolling, pitching, and heaving of the vessel under wave action within the ship channel and at the terminal or transshipment site;
- the estimated squat for the design vessel calculated for each critical depth area based on the maximum permissible operating vessel speed in the area and the most constricted channel section within the critical depth area;
- the effects of sagging or hogging;
- the nominal trim and changes of trim experienced by the design vessel;
- draught and trim changes attributed to any changes in water density;
- any climatic and related depth anomalies;
- nature of the bottom;
- allowance for manoeuvrability in shallow water;
- identification of any turns on the proposed route that might cause the vessel to heel and allow for the increase in draught; and
- an operational plan to ensure safe transit.

3.5 TRANSIT TIME AND DELAY SURVEY

3.5.1 The “transit time” component of this survey helps the proponent to assess and determine the safest coastal zone and/or inland waterway speed profile for the design vessels proceeding to and from the proposed marine terminal or transshipment site.

The “delay” component of this survey helps the proponent to identify the probable causes, locations, durations and the frequencies of delays in the movements of all marine traffic through a ship channel or ship channels connecting the coastal approaches and the proposed marine terminal or transshipment site.

The methods for obtaining this information may include:

- drawing conclusions from the Route Analysis, Approach Characteristics and Navigability Survey;
- completing a simulated or actual test run, or runs, using a vessel similar to the design vessel;
- using questionnaires distributed to selected vessel masters;
- getting advice from the applicable Pilotage Authority; and

- requesting data maintained by CCG Marine Communications and Traffic Services.

3.6 CASUALTY DATA SURVEY

3.6.1 As the breaching of a vessel's cargo containment system, or hull, is usually caused by a grounding or a collision, the objective of this survey is to determine the likelihood or probability of such an occurrence through the analysis of statistical casualty data within terms of:

- the mathematical probability of casualties in the future taking into account the additional traffic within the regional zone of the proposed marine terminal or transshipment site; and
- the inferred vulnerability of the design vessel over a specified period of time.

3.6.2 Casualty data surveys involving releases of cargo in bulk should not be confined to those attributable to collisions and grounding. It should include a listing of small scale incidents and the effects of these releases, as well.

3.6.3 The TRC recommends that a proponent apply inferential statistical methodologies to this survey. Sources of casualty data applicable to this survey may include:

- Classification Societies;
- P&I Clubs and underwriters;
- Transportation Safety Board casualty records or summaries;
- United States Coast Guard casualty records or summaries;
- IMO summaries;
- CCG Marine Communications and Traffic Services records;
- Pilotage Authority; and
- consultants' reports.

3.7 VESSEL SPECIFICATIONS

3.7.1 This survey will help the proponent to assess the suitability of the design vessel(s). The proponent should provide plans or technical documents of the design vessel(s). The TRC is interested in the following particulars and characteristics of the design vessel, including but not limited to:

- the LOA, LBP, breadth, beam and depth;
- the light draughts and air draughts;
- the summer and winter draughts and corresponding deadweight and displacement;
- tonnages - gross and net;
- vessel classification and identification of the Classification Society;

- ice class, where applicable, as designated by the responsible Classification Society;
 - cargo capacity;
 - cargo containment and cargo transfer systems;
 - main propulsion system (summary description);
 - steering gear arrangements;
 - main and auxiliary engine cooling systems;
 - de-icing or re-circulation systems;
 - vessel stability data, both intact and damaged;
 - manoeuvring data and information in accordance with IMO standards;
 - spill response plans and equipment;
 - intended shipboard navigational equipment;
 - intended radio and internal communications equipment to be installed;
 - and
 - intended crewing and certification standards.
- 3.7.2 The vessel should comply with all applicable IMO conventions and initiatives, directed at marine safety, and pollution prevention. The vessel must also comply with the *Canada Shipping Act, 2001, Arctic Waters Pollution Prevention Act* (where applicable) and other relevant Canadian statutes and all applicable marine and regulatory requirements.

3.8 SITE PLANS & TECHNICAL DATA

- 3.8.1 For this survey the proponent must demonstrate the suitability of the site with the design vessel(s), proposed operations and existing installations.
- 3.8.2 The proponent should provide the following plans and site studies as part of the TERMPOL submissions:
- overall site plan showing the location of the proposed structures in relation to existing structures and coastal features in the area;
 - general arrangement plan with bottom contours of not less than three m (10 ft.) showing the proposed location and size of:
 - all structures, floating and fixed,
 - turning basins and other manoeuvring areas,
 - separation between adjacent berths, between vessels and structures and between berths and navigational channels,
 - proposed anchorage areas, and
 - existing and proposed submarine pipelines, cable and other underwater installations
 - description and simulation of the proposed vessel manoeuvring procedures for docking and undocking under normal and maximum operating parameters;

- wind data based on actual wind speeds recorded in the vicinity of the site, and available in statistical form from Environment Canada's Meteorological Service of Canada. Consideration should be given if site-specific climatic (wind) studies should be carried out when historical data are insufficient or of little value to the site;
- wave data based on the actual wave climate recorded at the site or estimated from the recorded wind data, and available in statistical form from Environment Canada's Meteorological Service of Canada. The data may be presented in the form of wave energy spectra or wave height period parameters and direction at the locations of the berths and proposed structures. Where site-specific information is unavailable, regional averages may be sufficient to estimate likely wind and wave patterns. For example, this information may be available in the *Wind and Wave Climate Atlases for the East Coast of Canada, the Gulf of St. Lawrence and the Great Lakes*, commissioned by the Transportation Development Centre (Transport Canada);
- hydrologic survey and simulation showing, among other things, the tide and current data, taking into account variations with depths and direction, to be provided at each berth and its adjacent manoeuvring area, and to include predicted changes in tidal depths and current directions and velocities attributable to the construction of the proposed marine terminal or dredging in the terminal area;
- ice data including:
 - nature, types, coverage and movement of ice,
 - mechanical properties of the ice,
 - predicted ice formation, season and duration at the terminal,
 - average ice thickness, and
 - simulation showing its effect on the terminal structures
- water temperatures, including both annual and historical variances.

3.8.3 The proponent should also provide the basic terminal design, operating and safety parameters, including, but not limited to:

- the principal dimensions of the largest and smallest vessel to be accommodated at each terminal;
- an analysis and justification of the underkeel clearance and other clearances specified in this TRP, if different from the recommended nominal value;
- maximum operating parameters assumed in the design, in terms of wind, wave, current and ice conditions beyond which:
 - docking / undocking would not be attempted,
 - cargo transfer operations would cease, and
 - the vessel would vacate the berth

- design flow rates, pressures, temperatures, and liquid characteristics in different cargo transfer lines and hoses;
- descriptions of:
 - the fire protection system,
 - lighting for the berth and zones where transfer operations would take place,
 - any docking monitoring system,
 - any mooring load monitoring system,
 - the control and instrumentation system, the leak detection alarm system and the emergency shut-down equipment,
 - instrumentation for monitoring the wind, wave and current conditions,
 - waste management plan,
 - the pollution prevention equipment / programs and contingency plans at the terminal or transshipment site, and
 - the operational safety procedures and facilities at the terminal or transshipment site.

3.9 CARGO TRANSFER & TRANSSHIPMENT SYSTEMS

- 3.9.1 The proponent should demonstrate the suitability of the arrangements for transferring the cargo from vessel to shore (or vice versa), or from vessel to vessel. The proponent should provide the TRC with plans and descriptions of the design vessel's cargo containment and transfer systems, including the important shore components, for purposes of continuity.
- 3.9.2 The following is a list of preferred data for general guidance. The proponent should provide only what applies to the proposed project:
- general details of cargo pipelines and hoses connecting the vessel to the marine terminal;
 - intended cargo transfer rate between vessel and the terminals;
 - general details of cargo manifold and loading arm connections;
 - number and size of cargo transfer arms, their height above an identified datum, and their operational envelope;
 - proposed visual and audible alarms for loading arms when reaching their limiting angle within their operating envelope including:
 - the point at which the cargo transfer will be automatically stopped, and
 - the extreme limit of loading arm envelope when the flange coupler between vessel's manifold and loading arm will be released automatically or by means of manual controls
 - general details of electrical discontinuity arrangements between the vessel and the terminal;

- loading arm and shore manifold warming-up / cooling down procedures;
 - general details of purging, venting and inerting of cargo lines;
 - temperature sensors in the berth area, their location and alarm systems;
 - gas alarms, their number, sensitivity, and the details of continuous and/or intermittent sampling within the berth area;
 - visual and audible warning systems at the berth and main control rooms;
 - fire detection and protection including main and auxiliary fire pumps coverage for berth and vessel;
 - monitoring systems from control room ashore for:
 - loading arm(s), gas sensors and fire detection,
 - primary, secondary and emergency communication systems,
 - automatic and manual shut-down methods following a valve power failure in hydraulic, pneumatic or electric systems,
 - cargo pressures, temperatures and transfer rates,
 - activating a fixed fire protection device, and
 - safety equipment storage
 - source of emergency power supply;
 - procedures governing access to vessel during transfer operations;
 - pre-cargo transfer circulation test;
 - outline of proposed bunkering, vessel repair and provisioning schedules in relation to cargo transfer operations;
 - general details concerning reception facilities for ballast and/or for contaminated ballast from oil tankers;
 - general details showing the arrangements to receive tank washings from chemical carriers; and
 - special arrangements required by the nature of a particular substance being handled / transferred.
- 3.9.3 If the proponent intends to install an automated stability calculation and cargo transfer control system in the design vessel, then an abstract of the system's capability and limitations should be included in the submission, including the relevant details of the design vessel's stability characteristics and the approval Authority.
- 3.9.4 The proponent should adhere to the procedures for a thorough cargo transfer safety check list system as described in the *International Safety Guide for Oil Tankers and Terminals* (ISGOTT), the Oil Companies International Marine Forum (OCIMF) or equivalent.

3.10 CHANNEL, MANEUVERING & ANCHORAGE ELEMENTS

- 3.10.1 The objectives of this study are to assess the suitability of existing channels for the design vessel(s) and to identify those areas of concern where navigation requires particular attention.
- 3.10.2 The proponent should use the latest versions of the Canadian Coast Guard *Guidelines for the Safe Design of Commercial Shipping Channels*, the PIANC *Harbour Approach Channels Design Guidelines* and other relevant documentation. The study should be based on optimum operational conditions and an accurate system of marine aids to navigation being in place.
- 3.10.3 Proposed ship channels, anchorages and other relevant information should be depicted on large-scale nautical charts or engineering plans.

3.11 BERTH PROCEDURES & PROVISIONS

- 3.11.1 The proponent should assess and demonstrate that berthing and mooring arrangements are capable of handling the full range of vessels the terminal is intended to accommodate, under expected operating conditions. The proponent is responsible for demonstrating, through simulation or other means, the suitability of berths and moorings to safely accommodate the design vessels that will use them. The proponent should refer to and take into account relevant standards, recommendations and guidelines of various international authorities and associations such as those produced by OCIMF and PIANC.
- 3.11.2 Calculations of the loads imposed on the various components and structural elements of the terminal berths should include, but not be limited to, the following forces and appropriate combinations that apply to each structural element:
- dead loads of all piping, mechanical equipment, their liquid contents, superstructures and supporting structures;
 - berthing forces arising from normal fender thrusts and horizontal and vertical frictional shear forces;
 - mooring forces arising from wind, current, ice and wave pressures on largest vessels in ballast and full displacement conditions at the extreme operating conditions;
 - seismic forces from any horizontal direction computed for the dead loads and superimposed static loads, as well as seismic loads transmitted through pipeline anchors. **Note:** Seismic forces should be computed in accordance with the methods specified in the National Building Code. For piled structures, seismic forces should be assumed to be concentrated at the deck elevation;

- temperature loads due to thermal expansion and contraction of the structures, including those transmitted through pipeline anchors;
- wind load on the structures, superstructures and equipment;
- wind, wave and ice pressures on components of structure. **Note:** Wind and wave forces should be based on a storm loading having an average expected recurrence interval of 50 years;
- live loads of moving vehicles and cranes; and
- earth fill and hydrostatic pressures.

Each structural component should be proportioned to resist bending and shear in two directions, torsion and axial forces.

- 3.11.3 Each structure should be analyzed for a combination of permanent loads and transient peak loads. In general, allowable stresses and design procedures should conform to the National Building Code requirements. Increased allowable stresses may be considered, depending on the probable recurrence of the loading, the load duration and the corresponding risk factors.
- 3.11.4 The following guidelines are provided for the proponent's consideration for the berthing procedures:
- determine the upper limits of wind velocity for design vessel berthing operations - arrivals and departures;
 - determine the wind velocity that would require the design vessel to vacate the berth;
 - determine any other limiting environmental / operational criteria;
 - provide speed of approach measurement devices and a means of communicating this information to the berthing vessel;
 - ascertain maximum current measurements in the vicinity of the berth and its effect on berthing operations;
 - ascertain tidal range, velocities and directions and the maximum recorded spring tide measurements;
 - ascertain prevailing wind statistics in relation to the directional lie of the berth;
 - consider the effects, if any, of bathymetry in the vicinity of the berth and its approaches, on berthing strategy;
 - consider berth loading and dolphin fendering aspects;
 - consider the use of mooring points, mooring techniques and equipment, quick release hooks, and mooring line monitoring systems;
 - determine the method of docking and undocking the design vessel and the number of tugs, if required; and consider the number of mooring launches and personnel required for mooring.
- 3.11.5 The terminal operator should consider the need for waste reception facilities, i.e., waste, garbage, oil and noxious liquids.

3.11.6 The safety of the vessel and the terminal berth may be threatened by the simultaneous transfer of some bulk cargoes and vessel's stores. The proponent's intentions in this regard are of particular interest to the TRC. Accordingly, the proponent should submit plans in relation to the safety and security of the vessel and its personnel while alongside the berth.

3.12 SINGLE POINT MOORING PROVISIONS & PROCEDURES

3.12.1 The proponent should assess and demonstrate the suitability of a proposed single point mooring (SPM) for the design ship and safe operation in the local environment.

3.12.2 A TRP submission that proposes the use of an SPM, whether a buoy or a tower, should include the:

- geographical coordinates of the intended location;
- rationale for the site selected;
- relevant design details and the standards employed in the design; and
- ship securing components.

3.12.3 The proponent should outline the operational guidelines relevant to the SPM design specifications. A proposal to position an SPM in ice-covered waters would require special consideration by both the proponent and the TRC.

3.12.4 A single point mooring system should not be sited close to shipping routes or anchorage areas.

3.12.5 The proponent must outline the connect and disconnect procedures, taking into account environmental and operational criteria.

3.12.6 The TRC recommends that the proponent refers to and takes into account relevant standards, recommendations and guidelines of various international authorities and associations such as those produced by OCIMF and classification societies. Appendix 3 includes additional suggested criteria and guidelines for these facilities.

3.13 GENERAL RISK ANALYSIS & INTENDED METHODS OF REDUCING RISKS

3.13.1 This study requires the proponent to:

- 1) analyze the navigation and operation risks that could result in releases of pollutants and hazardous and noxious substances either en route or at a terminal or transshipment site; and
- 2) evaluate intended methods of reducing these risks.

These risks usually stem from a scenario involving but not limited to:

- a two-vessel collision;
- a vessel grounding;
- a vessel striking a fixed object;
- an improper cargo transfer incident;
- a fire or explosion; or
- hull failure.

The proponent should base predictions on credible worst-case accident scenarios in the terminal area and at selected positions along the coastal route.

3.13.2 The proponent's risk analysis should include the:

- probabilities of credible incidents that result in the breaching of the vessel's cargo containment system;
- risks associated with navigational and operational procedures;
- probabilities of a major cargo transfer incident at the terminal dock; and
- geographical boundaries of an uncontrolled release of cargo.

3.13.3 Analysis should not be limited to a mathematical index (probability of an incident) but should also include risks to:

- populations within coastal zones along the intended route; and
- the terminal berth and surrounding area.

3.13.4 Cargo may be released when the watertight integrity of an oil tanker's hull is breached. The proponent's risk analysis and oil spill prevention/contingency plan should include:

- predictive forecast models of nominal oil spill trajectories on water for credible worst-case accident scenarios at the terminal berth, at a transshipment site, and at appropriate coastal locations along the navigational route, taking into account the particular circumstances of the proposed site including, but not limited to:
 - environments of particular ecological sensitivity;
 - human habitation;
 - recreational activities;
 - local or regional economic considerations; and
 - aspects of social or cultural significance
- in developing predictions of nominal oil spill trajectories, the proponent should make reference to studies of prior incidents involving identical or chemically similar petroleum products;
- any predictions should reference any laboratory research conducted on the fate and behaviour of the specific petroleum or chemical products in simulated environmental conditions;

- planned on-shore and on-vessel counter-measures for an oil spill containment, clean-up, and public safety at the locations identified above.

3.13.5 When the watertight integrity of a chemical and other noxious substances carrier's hull is breached, the cargo may be released. The proponent's risk analysis and prevention/contingency plan should include the following:

- predicted reactions following the mixing of released cargo(es) with water, with other cargo chemical(s), or with substances required for normal vessel operations;
- predicted chemical, biotic or metabolic, and photo-chemical transformations once the released cargo(es) enter(s) the environment;
- toxicity of individual cargo chemicals and potential products formed by the combination of these chemicals with themselves or water;
- chemical incompatibility of cargo(es) and the measures that will be taken to reduce the risk of potentially dangerous combination products developing upon release; and
- the proponent's countermeasures for containment, clean-up, and, where applicable, public safety alongside the berth, at the transshipment site, and at appropriate locations along the intended route.

3.13.6 There may be a need to model gas plumes in certain circumstances. The technological basis for modeling large liquefied gas vapour clouds is constantly evolving. The selection of a particular gas cloud model should be made in consultation with the TRC. Any risk or dispersion model should include an analysis of the sensitivity of varying the assumptions or values input into the model. Predictions of specified gas cloud dimensions must be based on defined, credible worst-case accident scenarios involving the release of one cargo tank at selected locations along the route and at the terminal or transshipment site.

3.13.7 The determination of risks within a port that has been selected as the site of a liquefied natural gas (LNG) marine terminal or surrounding a transshipment site normally requires the determination of the following parameters:

- the vulnerability of the liquefied natural gas carrier's cargo containment system following a collision or grounding within the specified marine area;
- the probability of a large-scale, uncontrolled liquefied gas release within a specified marine area;
- the "nominal" quantity, rate and duration of released liquefied gas bulk cargo and the dimensions of the resulting vapour cloud;
- the proximity of populations to vapour cloud boundaries and the distribution of possible ignition sources;

- consequences impact radius for pool fire ignitions, vapour cloud overpressures and rapid phase transition explosions;
- consequences impact radius for asphyxiation due to oxygen displacement and exposure to direct dermal contact resulting in frostbite or potential mortality from freezing; and
- the vulnerability of adjacent storage tanks to being compromised and their cumulative volumes of explosive substances potentially contributing to additional fires and explosions, and thus, to larger consequences impact radii.

3.13.8 A deflagrating vapour cloud can be the cause of death and property damage within its boundaries. The threat of radiation burns exists in the peripheral area of an ignited vapour cloud as well. Detonations with lethal overpressures are possible if vapour collects in confined spaces before ignition. Quantifying and evaluating these risks is a complex process but an acceptable approach would be to calculate the risk of fatalities in terms of expected number of people affected at the time of the explosion.

3.13.9 Reducing or mitigating risks is an essential consideration in any TERMPOL submission. The proponent should evaluate ways to reduce these risks. While the particulars will vary depending on the proposal, it is possible to list a number of examples:

- using safe navigational / operational systems and developing a proactive pollution prevention program;
- locating the terminal in a remote location or one that is well separated from urban or suburban communities;
- designing and constructing or chartering vessels with the safest possible cargo containment and cargo transfer systems;
- adopting recognized and effective maritime mobile radio procedures that enhance safety in international, coastal, and inland waters;
- routing vessels with hazardous cargoes clear of primary shipping lanes and major shipping focal points when possible to reduce the incidence of close-quarter situations;
- proposing additional aids to navigation that individually or collectively improve navigational safety along the intended route;
- identifying areas where new bathymetric survey data may be needed;
- scheduling liquefied gas or chemical carrier movements through congested coastal waters to coincide with periods of low traffic, if possible;
- using recognized and effective vessel traffic services that enhance vessel safety in coastal regions. These include monitoring traffic movements, regulating speed profiles, broadcasting warnings, and regulating vessel movements in critical portions of the route to provide a clear channel for the design vessel;

- imposing limiting environmental or climatic requirements for vessels loaded with pollutant or hazardous cargoes when navigational safety within the terminal zone is an issue;
- providing a tug escort;
- following prudent berthing procedures and optimal tug assistance;
- using an energy absorbing protective barrier when alongside the terminal;
- employing pre-booming procedures before the transfer of hazardous product;
- manning vessels with fully competent crews adequately trained for the particular cargo(es) they handle and the design vessel they operate;
- keeping sufficient crew onboard at all times while a vessel is transferring hazardous cargoes so that the vessel is capable of getting underway at short notice;
- mooring a vessel transferring hazardous cargoes bow seaward when the terminal berth is located in a narrow arm of water so that in an emergency, the vessel can proceed seaward without delay and without the aid of tugs;
- the implementation of standardized cargo transfer system inspections and safety-oriented cargo transfer operations;
- raising awareness of standardized safety and cargo transfer procedures by means of port information publications designed to inform crews of vessels serving the proposed marine terminal. Note: The procedures should include specified upper climatic limits for berthing operations, for stopping cargo transfer operations, and for vacating the berth;
- prohibiting the venting of significant quantities of flammable or poisonous gases to the atmosphere in the vicinity of human habitations;
- providing appropriate reception facilities at chemical and oil terminals;
- scheduling the bunkering and provisioning of vessels transferring hazardous cargoes to a time that does not conflict with the maintenance of vessel and personnel safety during cargo transfer operations;
- controlling the access of visitors while the vessel is alongside the dock;
- developing and raising awareness about an effective contingency plan for the marine terminal system and conducting regular exercises of selected procedures described in the plan;
- having procedures in place that conform to internationally accepted safe management practices set out in IMO resolutions, ISM and/or ISO standards; and
- ensuring that any vessel chartered by the proponent complies with appropriate chartering standards, is of the same standard and meets the same requirements of the design vessel described in the submission.

3.14 PORT INFORMATION BOOK

3.14.1 The Port Information Book (PIB) provides vessel's personnel and other interested parties with all the relevant details related to the specific route to, and about, the marine terminal system or transshipment site. Much of this information can be found in the surveys required for the TRP. The proponent should provide an outline of the PIB for the TRP. The actual Port Information Book should be completed six months before operations begin. Items to cover include, but are not limited to:

- berthing strategy in terms of the design vessel's approach and departure from the terminal berth; tug assistance requirements; mooring assistance requirements; the upper limit of lateral approach rate to the berth by the design vessel and the means of measuring and indicating wind speed and the vessel's lateral approach rates;
- upper limits of berthing operations in terms of wind velocity, wave heights, tidal stream velocity, ice cover, visibility, and the means of measuring and indicating these factors;
- the upper wind velocity limits that would necessitate the cessation of cargo transfer operations and cause the departure of the vessel from the berth;
- load measurements and limits for mooring lines and dockside bollards used by large vessel/carriers;
- pilots, tug assistance details, procedures for mooring boats, line handlers and the means of communications between vessel / tugs / berthing superintendent and mooring boats;
- vessel machinery and equipment repairs facilities;
- storing and bunkering facilities;
- waste reception facilities;
- security and industrial safety matters;
- vessel reporting procedures;
- pilot boarding procedures;
- vessel / shore communications procedures;
- designated anchorages; and
- emergency measures.

3.14.2 Because vessel personnel and the terminal's cargo transfer staff are separated during much of the preparatory phase of a scheduled cargo transfer operation, the Port Information Book should include an explicit schedule of the communications that the master of the vessel must initiate. The text of the transmission should enable the marine terminal operator, the vessel's agent, the harbour master, the pilotage authority, the Canadian Coast Guard and Transport Canada Marine Safety and Security to be informed, in a timely manner, with needed information. The timing of the scheduled messages should take into account the common administrative delays in message

handling and message distribution in other than direct vessel / terminal communications.

3.15 TERMINAL OPERATIONS MANUAL

- 3.15.1 The Terminal / Transshipment Site Operations Manual (TOM) should inform and guide the crews of vessels calling at the proponent's terminal or transshipment site of important subject matters that affect the safety of the vessel, the terminal or transshipment site itself, and the efficiency of the vessel's cargo transfer operations. Note that, while a vessel may call at a particular terminal or transshipment site for many years, vessel's crews change frequently and it is the crew who play the primary role in ensuring vessel safety during transfer procedures.
- 3.15.2 The TRC recognizes and appreciates the technical and economic reasons for not producing the complete text of a TOM before the terminal or transshipment site has received regulatory approvals and, in the case of a marine terminal system, before construction begins. The TRC believes that the substance of the information in the TOM is so important that it should receive early attention by the proponent's planning staff; therefore the proponent should provide an outline of the Terminal Operations Manual. The proponent should provide an outline of the TOM for the TRP. The actual TOM should be completed six months before operations begin. The list of subject matters that follows should be considered as the minimal content of the TOM:
- inspections, testing and preventative maintenance of terminal berth equipment used by vessels;
 - pre-arrival and departure operational tests and checks of vessel's machinery and equipment;
 - cargo pre-transfer inspections, checklists, and conferences;
 - vessel-terminal hose-manifold connections; vessel-terminal communications and chain of authority;
 - cargo handling procedures, including emergency shut-down procedures;
 - safety precautions and vessel-oriented emergency procedures that would be included in the terminal's contingency plans; and
 - receiving facilities for waste oil, ballast, dirty ballast, slops and garbage.

3.16 CONTINGENCY PLANNING

- 3.16.1 The primary purpose of contingency planning is to be prepared to respond to abnormal events when they occur. The effectiveness of any contingency plan depends on the personnel regularly exercising their respective roles and responsibilities. The TRC expects the proponent to provide a preliminary

outline for the intended contingency plan for review as it relates to a vessel in transit and/or alongside the proposed marine terminal berth or transshipment site. This review will allow the proponent to harmonize the plan with existing emergency operation procedures, to ensure an integrated and coordinated response with other key authorities such as the Canadian Coast Guard.

3.16.2 Topics to include in a vessel-oriented contingency plan while a vessel is en route to, from or at the terminal or transshipment site should deal with:

- incidents involving the release of cargo(es);
- fire and explosions;
- operations monitoring systems;
- terminal-vessel communications;
- inspection, testing, and preventative maintenance procedures;
- cargo handling precautions applicable to the vessel;
- neutralizing electrical hazards;
- detection and alarm systems at the vessel's berth;
- emergency shut-down of cargo transfer operations;
- emergency responses to incidents involving a discharge of a pollutant from a vessel, or a discharge of oil from an oil handling facility engaged in loading to or unloading from a vessel, that directly or indirectly results in the pollutant entering the water, and includes spilling, leaking, pumping, pouring, emitting, emptying, throwing and dumping;
- countermeasures that reduce, contain or neutralize the damage outside the vessel or oil handling facility caused by contamination resulting from a discharge from the vessel or facility;
- outline of emergency equipment for personnel proposed for the berth area and the evacuation procedures for personnel; and
- emergency procedures that would require the vacating of the terminal berth and the disposition of the vessel.

3.16.3 Those aspects of the terminal-oriented contingency plan of interest to the TRC focusing on the vessel alongside could include the following situations:

- fire on board;
- releases resulting in structural damage and/or personnel injuries;
- equipment malfunctions;
- improper cargo transfer;
- rapidly deteriorating weather or ice conditions and possible evacuation of the berth;
- grounding or collision at or near the berth;
- fires on dockside, pipelines in the immediate vicinity of the berth, and the tank farm; and
- emergency situation at the terminal.

- 3.16.4 Procedures relating to incidents that require active responses from the vessel's personnel should be specific, succinct, clear, and communicated in the operational language(s) of the vessel. The vessel's personnel should be aware of the terminal-vessel chain of command and of emergency drill requirements and procedures and be able to communicate with the terminal's personnel.

Procedures relating to incidents that require active responses from the terminal personnel involved with transshipment operation should be specific, succinct, clear and communicated to the vessel.

- 3.16.4 The proponent must also prepare a study showing the extent to which an incident would likely have an adverse effect upon third-party interests and how the proponent would address this through remediation and/or compensation.

3.17 OIL HANDLING FACILITIES REQUIREMENTS

- 3.17.1 The proponent must describe how they will comply and maintain compliance with the CSA 2001, Part 8, section 168 and all related regulations, standards and guidelines related to the prevention, preparedness and response to potential discharges that may occur in preparation for and during transfer operations between design vessels and oil handling facilities (OHF).
- 3.17.2 In this survey, the proponent should consider including the following information when formulating prescribed OHF Pollution Prevention and Emergency Plans:

- Establishing environmental objectives and plans based on OHF activities that the operator can control, that could cause a discharge and that could have a significant impact on the environment.
- All operators must be prepared to take immediate mitigating action in the event of an oil pollution incident that invokes a Transport Canada certified response organization arrangement. The degree to which the operators must be prepared to respond will be based upon oil pollution incident scenarios for the prescribed oil handling facilities and the quantity of oil that is scheduled to be transshipped, to a maximum of 10,000 tonnes.

The scenarios should take into account such factors as the nature of the product, attending vessel types, tides, currents, predominant meteorological conditions, assessment of the surrounding environmental sensitivities, OHF geographic location, preventative measures and the speed at which an effective response can be carried out successfully.

The oil pollution emergency plan should include one oil spill response scenario for each category of oil product loaded or unloaded to or from

vessels. In the scenarios, the environmental conditions should be those predominant for the area.

In respect of required plans for prescribed OHFs in the waters north of the sixtieth parallel of north latitude, proponents should consider demonstrating facility preparations for response to oil pollution incidents for the quantity of oil that is scheduled to be transshipped, to a maximum of 10,000 tonnes, that do not include entering into an arrangement with a response organization.

- Maintaining up-to-date documents containing all relevant regulations, standards, procedures and policies concerning such areas as response measures, operation, maintenance and inspections, site plans, record keeping, permits and certifications, violations, compliance and follow-up.
- The facility oil pollution emergency plan should contain sufficient details of the roles and responsibilities of the persons or organizations associated with a response to an oil pollution incident at a prescribed oil handling facility to ensure that all essential activities will be addressed. This should include those who will be working at the prescribed oil handling facility in the event of an oil pollution incident.

In plans for prescribed OHFs in waters south of the sixtieth parallel of north latitude, further considerations and details should be outlined on the roles of persons and organizations responding to oil pollution incidents at the facility, related to facility response requirements and the preparations, which include details of a formal arrangement with a Transport Canada certified response organization.

- The training and competency of personnel with OHF prevention and response duties should ensure, among other things, safe operational requirements, safe use and maintenance of equipment, shut down and restart procedures, and knowledge of risks that may threaten safe operations.
- Establish and maintain hazard identification procedures that identify the OHF's activities with the potential for causing a discharge. They should cover key elements including, but not limited to hazards related to the vessel, berthing, oil transfer operations, staffing of key positions, and equipment failures.
- Maintain up-to-date, comprehensive (scientific) understanding of all products proposed to be shipped and their potential fate and behaviour(s) for the purpose of informing response operations at the OHF including, but not limited to, the specific gravity of all products to be shipped and in relation to the weathering and biodegradation of those products in any water environments that may be potentially affected by the discharge of a pollutant at the OHF.

- For the purpose of informing response operations at the OHF, the planning for a pollution incident should be linked to specific product trajectory modelling in the proposed geographic location of the OHF, taking into account the fate and behaviour of all proposed products to be transferred to and from vessels at the OHF.
- Plan, schedule and conduct exercises to develop a sound knowledge of the geographic environmental risks and the application of their pollution prevention and emergency plans in respect of those risks.
- Maintain a system for measuring and monitoring actual performance against the oil handling facilities' prevention and response environmental objectives and targets.

3.18 HAZARDOUS & NOXIOUS SUBSTANCES CONSIDERATIONS

- 3.18.1 The objective of this survey is for the proponent to describe how it will implement the relevant International Maritime Organization (IMO) instruments concerning hazardous and noxious substances (HNS).
- 3.18.2 The proponent should also develop and maintain the necessary procedures, which include (but are not limited to) incident preparedness and response training and an exercise program with local, municipal, provincial and national authorities, including spill response contractors having expertise in dealing with the product(s) handled at the facility.

APPENDIX 1: LIST OF SOURCES OF INFORMATION

The following is a list of the main international authorities and associations that have standards or guidelines to assist the proponent in developing the various studies and surveys required by the TRP.

1. International Maritime Organization (IMO)
2. International Association of Classification Societies (IACS)
3. International Association of Lighthouse Authorities (IALA)
4. International Association of Ports and Harbors (IAPH)
5. International Cargo Handling Co-ordination Association (ICHCA)
6. International Chamber of Shipping (ICS)
7. International Hydrographic Organization (IHO)
8. International Maritime Pilots Association (IMPA)
9. International Petroleum Industry Environmental Conservation Association (IPIECA)
10. International Shipping Federation (ISF)
11. International Association of Independent Tanker Owners (INTERTANKO)
12. Oil Companies International Marine Forum (OCIMF)
13. Permanent International Association of Navigation Congresses (PIANC)
14. Society of International Gas Tankers and Terminal Operators Ltd. (SIGTTO)
15. Classification Societies
16. International Labour Organization (ILO)

APPENDIX 2: RECOMMENDED APPROACH TO ABORIGINAL ENGAGEMENT

Why Engage

Aboriginal groups residing along shipping routes may have an interest in participating in TRPs being conducted in their areas. TRPs are usually associated with projects that involve new or expanded activities (e.g., the transport of a new cargo). Outside of a TRP, Aboriginal groups may be consulted on the project for which the TRP is being conducted.

As such, it makes sense for proponents to engage Aboriginal groups (along with other local waterway users) early in the process, in the *surveys and studies stage* of a TRP. TRP surveys and studies may deal with subject matter of interest to Aboriginal groups who may have local and traditional knowledge that could enhance the technical assessment of marine safety.

How to Engage

Transport Canada recommends that the proponent:

- provide sufficient information about the project to enable participants' understanding of the project;
- listen to concerns raised by Aboriginal groups and, where possible, address these concerns;
- provide Aboriginal groups with an opportunity to review and comment on the draft surveys and studies of interest, and consider Aboriginal groups' comments;
- document its efforts to engage Aboriginal groups, including a written communication log, a summary of issues raised, how the proponent has addressed concerns (as applicable), and a description of outstanding issues;
- provide Aboriginal groups with an opportunity to review and validate the summary of issues raised; and
- provide Transport Canada with a copy of the documentation above.

Transport Canada can assist proponents by:

- helping to identify potentially interested Aboriginal groups; and
- providing information to Aboriginal groups about the TRP.

APPENDIX 3: SINGLE POINT MOORING GUIDELINES

1 INTRODUCTION

- 1.1 This Appendix outlines general information to supplement that given in Section 3.12 of TERMPOL Surveys and Studies. It should not be regarded as exhaustive. The proponent's attention is drawn to other standards, recommendations or guidelines of various international authorities or associations such as those produced by the Oil Companies International Marine Forum (OCIMF).
- 1.2 Design loads, based on an average expected recurrence interval of 50 years, should be calculated for the various components of the SPM (buoy or tower) using the most adverse credible combinations of forces generated by wind, wave, current, ice accretion, dead loads, surge, drag, collision, and wave wash that are within the operating criteria. Mooring forces should be derived with the aid of model tests and/or computer analysis. Model tests may also be required to evaluate the overall stability, dynamic behaviour and interaction of the system components under all design loading conditions.
- 1.3 Special consideration should be given in the design of component connections, moving parts and fittings to fatigue, wear, freeze-up and binding. All components should be designed so that they are readily accessible for inspection and maintenance.

2 DIMENSIONS

- 2.1 The mooring circle should have a minimum radius of three times (3X) the length of the design ship. A larger radius may be required depending on the local weather and sea conditions.
- 2.2 The mooring circle should be so located that the closest point on its circumference should be not less than 300 metres from the requisite minimum water depth contour.

3 CONSTRUCTION

- 3.1 Swivels should be operable in all weather, including icing conditions, and should be designed so that the turntable can rotate freely with the floating hose assembly under the wind and current forces. Seals should prevent all leakage and should be effective in all weather conditions that are within the operating criteria.

- 3.2 Each SPM should be equipped with a mooring load monitoring device.
- 3.3 An SPM buoy should be designed for “fail-safe” buoyancy provided by compartmentation, double-bottom tanks, mono-cellular flotation or other means. Adverse effects of ice accretion on buoyancy and stability should be investigated.
- 3.4 The buoy should be fitted with integral fendering and a skirt for protection against override by ships and impact with the floating hoses. The fendering system should be such that it not only protects against collision by ships at drift speeds, but is also capable of absorbing any impact should the fenders come into contact with any part of the cargo system.
- 3.5 The buoy should be designed so that when the maximum mooring load is applied statically to the installed buoy in calm water, no part of the deck will be submerged.
- 3.6 The construction of the buoy body, rotating assembly, mooring fittings and bearings should be such that the maximum mooring force can be transmitted to the buoy anchor system, but the system should be designed such that the ship-to-buoy mooring will fail before overloading the buoy or its anchorage system.
- 3.7 Automatically activated lights and foghorns, fire alarms and fire extinguishers should be provided for buoy structures and should comply with Canadian Coast Guard standards. This equipment should also include at least one lifebuoy with attached, automatic light and buoyant life lines. Means should also be provided for the attachment of safety lines in all working areas and gratings. Ladders and handrails should be fitted as required to ensure safe access to operating equipment. All electrical equipment should be explosion-proof and watertight.

4 LINES

- 4.1 The sea bed manifold of the submarine lines should be anchored to the sea bottom, and should be provided with a “failsafe,” automatic means of closure that can also be activated manually at the buoy or at a shore connection.
- 4.2 Subject to an acceptable inspection and maintenance program, all submarine lines should be entrenched in the sea bottom, where the following measures cannot be met:
 - a special study should be carried out to ensure that the lines will not form an obstruction to natural sediment movement;

- the lines should traverse a route of minimum cross current and uniform gradient and there should be no unsupported sections; and
 - anchors and/or concrete weight jacks may be required to stabilize the lines against sliding.
- 4.3 Floating hoses should be connected to the buoy piping in such a manner to ensure that loads on the hoses are kept within the manufacturer's design limits. Special consideration should be given to the effect of icing on the hose buoyancy.
- 4.4 Under-buoy hoses should be designed so that under all conditions they form a faired curve between the bottom manifold and the underside of the buoy and do not touch bottom. Under-buoy hoses should have electrical discontinuity. All hoses and ancillary equipment, including flange bolting and gaskets, should comply with the "Single Point Mooring (SPM) Hose System Design Commentary," "SPM Maintenance and Operations Guide" and "SPM Ancillary Equipment Guide" published by the OCIMF.
- 4.5 The maximum mooring line load in any ship-to-buoy line should be limited to forty percent (40%) of the breaking strength of the line. This ship-to-buoy mooring line should be designed as the weakest link in the system. Compatible automatic sealing breakaway type couplings should be fitted in the hose lines.

5 ANCHORING

- 5.1 A 6-leg anchor system or an alternative acceptable anchoring system should be provided for the buoy. The anchorage system should have adequate strength to maintain buoy stability in the event of failure of any one part without damage to the under-buoy hoses or remaining chains.
- 5.2 All anchor chains should have sufficient length so that under maximum mooring load a sufficient length of chain at the anchor end will remain in contact with the sea-bed.
- 5.3 The maximum design tension in any anchor chain should not exceed thirty-five percent (35%) of its breaking strength.

6 OPERATION

- 6.1 The cessation of cargo transfer operations and/or the tanker departure from an SPM prior to adverse weather conditions is often based on specified sea, swell, and wind conditions. These specifications are site-specific; however, the following are averages of world-wide data assessments and are provided for general information:

- cargo transfer operations should be suspended at an SPM when wave height are in excess of 2.5 metres significant and/or wind velocities exceed 20m/s (39 knots);
 - tankers should disengage from the SPM when seas with wave heights exceed 4 metres significant and/or wind velocities exceed 30 m/s (58 knots); and
 - loading tanks attached to the buoy should have adequate stability and sea-keeping characteristics and compatible hose securing devices.
- 6.2 In the interest of safety, a consistent site-specific weather forecasting service is recommended for SPM locations.