

Ice Assessment & Safety Guideline



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Documentation Maintenance

Responsibility

The accountability for the Ice Assessment & Safety Guideline development and maintenance is the Manager, Emergency Management. This accountability is such:

- The document is owned by the Emergency Management Program as an additional procedural document to the Geographic Response Plan.
- The administrative management for the Ice Assessment & Safety Guideline will be administered by the Emergency Management Program.

Plan Revisions

All requests for change must be made through the Manager, Emergency Management using the Revision Request Form located in this section of the plan.

Revisions after Spill or Exercise

In the event that Trans Mountain experiences a spill (worst case or otherwise), or conducts an exercise or training session, the effectiveness of the ERP and its supplemental plans and procedures will be evaluated and updated as necessary.

Changes in Operating Conditions

If a new or different operating condition, or information, would substantially affect the implementation of the ERP and its supplemental plans, Trans Mountain will modify these to address such a change.

Revision Request Form

Requested by:	Date:
Dept/ Agency:	Phone No.:
Revision Type: ___ Addition ___ Deletion ___ Correction	
Manual Section:	Page:
Revision (attach separate sheet if necessary):	
Signature of Requestor:	
Send to: Manager, Emergency Management Trans Mountain 2700-300 - 5 th Avenue S.W. Calgary, AB T2P 5J2 Canada emergency_management@transmountain.com	

To be completed by Manager, Emergency Management	
Date Received:	Comments:
Date Reviewed:	
Issued as Revision: Y/ N	
If No, reason for Rejection:	
Signature Manager, Emergency Management	

1.0 INTRODUCTION

1.1 Purpose

The purpose of this Ice Assessment & Safety Guideline is to act as a guidance document for Trans Mountain responders to safely assess and conduct on-ice operations. It outlines the appropriate considerations for safely conducting ice assessment and safety activities prior to beginning on-ice response actions.

1.2 Scope

The Ice Assessment & Safety Guideline document applies to all Trans Mountain employees and contractors who are conducting on-ice emergency response procedures. The scope of this plan is intended to cover the ice assessment and safety documentation completion procedures that are required prior to beginning on-ice response operations.

This Ice Assessment & Safety Guideline acts as a supporting document to the Geographic Response Plan (GRP) Section 4.4 Winter Response. This guideline document should be considered as an operational tool used to assist Trans Mountain during the deployment of spill response equipment on ice-covered waterbodies.

1.3 Objectives

- Outline the ice assessment process and forms for the deployment and operation of equipment on ice-covered waterbodies.
- Outline the required safety processes and documentation to be completed prior to conducting assessment and response activities.

1.4 Revisions

In the event that Trans Mountain experiences a release (worst case or otherwise), or conducts an exercise or training session, the effectiveness of this procedure will be evaluated and updated as necessary.

2.0 SAFETY PLANNING ACTIVITIES

2.1 Introduction

Implementing proper safety planning is critical prior to beginning deployment of personnel and equipment on to ice-covered waterbodies.

The safety planning activities required by Trans Mountain prior to deploying on to ice covered waterbodies are to complete a tailgate meeting utilizing the standard Trans Mountain Job Hazard Assessment (JHA) form, in addition to an Initial Site Health and Safety Plan (ISHSP), and a Communications and Rescue Plan.

2.2 Job Hazard Assessment (JHA) Process

The Job Hazard Assessment process is a standard safety process conducted by Trans Mountain prior to undertaking any hazardous work activities and is not specific to emergency response activities. The Initial Site Health & Safety Plan (ISHSP) is designed to be employed in lieu of completing the JHA form process to expedite safety planning during an emergency response. As an emergency response on ice-covered waterbodies presents unique hazards for responders, the Initial Site Health and Safety Plan should be supplemented by a more fully developed Job Hazard Assessment (JHA) form when time permits. The information listed below is designed to be used as a guide to the elements of information that should be incorporated into a completed JHA form for on-ice response operations.

2.2.1 JHA On-Ice Response Potential Hazards / Controls Information

The following activities are potential hazards facing responders when deploying response equipment and personnel on to an ice-covered waterbody. This section outlines various hazards and controls that can be consulted and incorporated, as necessary, by personnel when completing the JHA form.

2.2.1.1 Ice Evaluation Activity Hazards

- Falling through ice-lacerations head trauma, hypothermia, frostbite, swept away by current, drowning, death.
- Thin Ice
- Slips/Trips/Falls
- Cold Weather
- Rotating Equipment
- Flying Debris and Ice
- Cold Water
- Deep Water
- Fast Water

2.2.1.2 Ice Evaluation Activity Controls

- Utilizing a powered or hand ice auger while wearing a manned tag line & harness, drill test holes in areas to be worked to check thickness and quality of ice. Lay out a grid across the channel area that will be worked to check for thicker/thinner areas in the channel, noting thickness w/ice gauge, ice type/quality, water flow direction and speed (with a flowmeter) under the ice. Consult the Trans Mountain *Ice Assessment Form* located at the rear of this document to capture the required information.
- Ice thickness evaluation does not allow for ice quality assessment. That needs to be done by retrieving a block near the work area and determining BLUE vs WHITE ICE and effective ice thickness in cm to input into Gold's formula on the *Ice Assessment Form*.
- Any personnel on the ice will be secured to shore using an anchor system and recovery line
- Any personnel working on the ice will wear cleats or other traction devices to reduce slipping. Walking poles are recommended
- All personnel should dress in layers sufficient to the weather.
- Personnel will keep their hands and limbs away from the auger while it is operations. Gloves shall be worn at all times.
- Safety glasses must be worn during all operations
- All personnel working on the ice should wear survival suites to reduce the risks of prolonged exposure.
- Lifejackets are to be worn by all personnel working within 1 meter of the water body and until the iced assessment is completed, weight bearing capacity is determined and controls are placed around any areas of concerned i.e. fencing around an open slot dictates the need for lifejackets, harnesses and tag lines.
- A standby rescue team will be stationed upstream far enough to rescue personnel if operations are to be undertaken on ice-covered fast-moving watercourses. Consult the Trans Mountain *Communications and Rescue Plan* form at the end of this document.

2.2.1.3 Containment/Ice Slotting Activity Hazards

- Insufficient Ice for Weight
- Heavy Equipment
- Pinch Points
- Sharp Tools
- Heavy Loads
- Awkward Body Position
- Fire/Explosion

2.2.1.4 Containment/Ice Slotting Activity Controls

- Utilize the Trans Mountain *Ice Assessment Form* section containing Gold's Formula to ensure that there is enough ice to support the total weight of all personnel and equipment to be deployed on the ice.
- Make sure that you have made eye contact with equipment operators before moving into the equipment's work area.
- Avoid walking between pieces of mobile equipment and or stationary objects. Keeps limbs out of the line of fire.
- All workers must wear gloves and chaps while working with the ice saws or chainsaws.
- Utilize equipment or multiple personnel for heavy lifts. Make sure proper lifting technique is used.
- Take frequent breaks to prevent repetitive strain injuries.
- All equipment must be shut off prior to refueling. No smoking except in designated areas.
- All refueling activities of equipment should take place back on land and inside of containment.

2.2.1.5 Product Recovery Activity Hazards

- Hydrocarbon Exposure
- Splashing Hazards
- Wet Clothes
- Rotating Equipment
- Fumes

2.2.1.6 Product Recovery Activity Controls

- Chemical resistant outer layers should be worn. If exposure does occur decontamination equipment should be on hand including absorbent pads, hand cleaner and eyewash stations.
- Water resistant outer layers should be worn as well as safety glasses.
- Personnel should have a change of clothing. An area for changing out of wet clothes should be supplied.
- Keep fingers and hands away from the skimmers rotating drum.
- Crews will have a multi gas monitor on hand to assess air quality. Respirators will be supplied where required.

2.3 ISHSP & Communications & Rescue Plan

In addition to the ISHSP form that is required to be completed at the outset of every emergency, there is a requirement to complete a *Communications and Rescue Plan* form. This form details information, such as the designated standby rescue team members, rescue actions to be undertaken, first aid attendant(s), communications procedures, and methods. Once the ISHSP form and the Communications & Rescue Plan form are completed, the ice assessment process can begin. A JHA should be completed as soon as possible to capture additional hazards and controls.

3.0 ICE ASSESSMENT PROCESS

The procedures outlined in this section are those that can be undertaken by Trans Mountain Responders when initially deploying to an incident scene requiring a deployment of equipment/personnel onto an ice-covered waterbody. The ice assessment process can only be undertaken once the required ISHSP and Communications and Rescue Plan forms are completed.

3.1 Ice Assessment Procedures

3.1.1 Ice Assessment – Ice Augering & Test Procedure

Prior to commencing any activity over a frozen waterbody, the type, strength and thickness of the ice must be established. Utilize the following steps for measuring ice thickness and determining weight bearing capacity.

- Prior to conducting the ice assessment, a tailgate meeting should be conducted which includes a review of the Initial Site Health and Safety Plan (ISHSP). In addition to the ISHSP and Ice Rescue Plan must be completed. A JHA form incorporating information from Section 2.0 of this document should be developed and communicated with all responders. If required, a trained ice rescue crew should be on standby.
- Personal Protective Equipment should be reviewed during the tailgate meeting and donned prior to conducting operations.
- Ice assessors will work in pairs and don safety harnesses secured with rope to shoreline crews before moving onto ice.
- Utilizing an ice auger, the assessors should drill the first test hole while standing on the shoreline to determine if it is safe to proceed onto the frozen waterbody.
- In order to determine ice weight bearing capacity, utilize the ice measurement tool located on the Winter Response Trailer. The measuring stick is placed into the drill hole to determine total ice thickness. All measurements should be recorded on the *Ice Assessment Form* located at the rear of this document.

- To calculate the weight bearing capacity utilize the following formula.

Gold's Formula - $P = A \times h^2$

where:

P is the calculated allowable load in kilograms

A is the selected risk tolerance value

h is the effective thickness of good quality blue/white ice (cm)

"A" values range from 3.5 to 6 depending on overall risk tolerance. Selecting a lower "A" value when completing the calculation allows for a more conservative weight bearing capacity. **For Trans Mountain's purposes a preliminary "A" value of 3.5 should be utilized for rivers, 4 for lakes.**

- When determining total ice thicknesses exclude any surface snow in the measurement. Record the thickness for each test hole using the *Ice Assessment Form* located at the rear of this document.
- Assessment should only continue if ice thickness is determined to be adequate.
- Subsequent test holes should be drilled working in a straight line from the original hole. Distance between test holes should never exceed 10 metres (5 metres on moderate to fast moving river systems). Ensure that each test hole is indicated on an *Ice Assessment Form* site diagram page and that holes are marked with a pylon or other device for visual reference. Additionally, a GPS reference for each drill hole may be taken and recorded.
- Augured test holes should be reevaluated at minimum every two days to ensure that thickness has not significantly decreased. If substantial temperature changes occur during response operations, then test holes should be reevaluated more frequently.
- Once the identified work area for containment and recovery operations has been reached an additional weight bearing capacity assessment for response equipment must be completed.
- This is done by cutting and extracting an ice block from the work area, moving the block to the safety of the shoreline and measuring the different types of ice formed within the block sample. Utilize Gold's Formula to then determine the work areas total weight bearing capacity which will in turn indicate the type and number of responders and response equipment that may be utilized for safe operations.
- On lakes, the distance between test holes may be substantially increased with the trailing responders remaining well behind. Extra caution needs to be exercised along shore, as the floating ice cover may actually be thinner near the shore. In addition, as progress is made across the lake, sampling distances will need to be shortened as the ice thickness begins to decrease. **If any sample reveals clear blue ice less than 10 centimeters thick, responders are to leave the area immediately.**

3.1.2 Ice Assessment Test Holes Spacing Requirements

Recommended Maximum Spacing Of Auger Test Holes For Measuring Ice Thickness		
Water Body Type	Initial Testing	Construction/Operations Activities
Rivers – fast moving or high currents	5 m between test holes along centre line or a minimum of 5 holes	25 m between test holes along alternating sides of centre line
Rivers – slow moving and within 250 m of shore	10 m between test holes along centre line	50 m between test holes along centre line Check known thin areas
Rivers – slow moving and more than 250 m offshore	20 m between test holes along centre line	100 m between test holes along centre line
Lakes – within 250 m of shore	10 m between test holes along centre line	50 m between test holes along alternating sides of centre line Check known thin areas
Lakes – more than 250 m offshore	20 m between test holes along centre line	100 m between test holes along centre line

These are maximum spacings for ice auger measurements — additional measurements may be required to locate thin areas.

Source: Alberta Labour, *Best practice for building and working safely on ice covers in Alberta* (2013).

3.1.3 Ice Thickness Weight Bearing Capacity Chart

Potential Load of Blue Ice (risk tolerance value is 3.5)	Effective Ice Thickness (Centimeters)	
	Lake [^]	River
*One person on foot (87.5 Kg/74 kg)	10 cm minimum	11.5 cm minimum
*Group, single file (224/190 kg)	10 cm minimum	11.5 cm minimum
Passenger car (1400 kg/1190kg)	20 cm minimum	23 cm minimum
Light truck-1/2 ton (2,700kg/2318 kg)	20 cm minimum	23 cm minimum
Medium truck-3/4 ton (3704 kg/3148 kg)	28 cm minimum	32 cm minimum
Heavy truck-1 ton (5909 kg/5000 kg)	41 cm minimum	41 cm minimum

*NOTE: if a person/persons plan to be in one area for more than 2 hours the ice must be a minimum of 15 cm thick.

[^] Guide applies to blue/clear ice only.

3.1.4 Ice Cracks Types

Type of Crack & What It Means	Recommended Actions
Crack Caused by Change in Temperature & Ice Thickness	
Dry Cracks <ul style="list-style-type: none"> Do not reach bottom of ice cover. Caused by ice bending due to the weight of load, temperature changes. 	Dry Cracks through 1/4 to 1/2" ice thickness: <ul style="list-style-type: none"> Flag Area, Monitor and repair, record repairs Dry Cracks though >1/2" ice thickness: <ul style="list-style-type: none"> Flag and Close Area Report Cracks to Supervisor / Safety Watch
Wet Cracks <ul style="list-style-type: none"> Crack reaches bottom of ice cover, allowing water to reach the surface. 	<ul style="list-style-type: none"> Flag and Close Area to Others. Report Cracks to Supervisor / Safety Watch
Crack Caused by Overloading	
Radial Cracks <ul style="list-style-type: none"> Looks like spokes in a wheel A warning that ice is overloaded – load may break through the ice. 	<ul style="list-style-type: none"> Immediately Remove Load From Ice. Report Cracks to Supervisor / Safety Watch
Circumferential Cracks <ul style="list-style-type: none"> Form a circle around the load. A warning that ice is overloaded – load is about to break through. 	<ul style="list-style-type: none"> Immediately Make Sure Everyone Leaves The Area Report Cracks to Supervisor / Safety Watch
EXTREME DANGER: Circumferential Cracks Connected With Radial Cracks <ul style="list-style-type: none"> Form pie shaped wedges. Ice has failed; if not already broken through, it can do so at any minute. 	<ul style="list-style-type: none"> Immediately Make Sure Everyone Leaves The Area Report Cracks to Supervisor / Safety Watch

Source: Alberta Labour, *Best practice for building and working safely on ice covers in Alberta* (2013).

APPENDIX A - ICE SAFETY PLAN - FORMS

TRANS MOUNTAIN COMMUNICATION & RESCUE PLAN

Date:	Time:	Site Phone #:
On-site Supervisor:	Safety Watch (if applicable):	
Rescuer #1	Standby #1:	First Aid Attendant:
Rescuer #2:	Standby Backup:	Other:
Communications Plan		
<ol style="list-style-type: none"> 1. Standby has visual/verbal contact with individuals working on ice. 2. If an emergency occurs, the Standby will use verbal communication to summon rescuers. 3. Standby – Notify on-site First Aid Attendant. 4. Standby – Verbally communicate for all observers to remain in exclusion area. 5. Standby – Place call to ambulance or other emergency service. 		
Provide Site Location:	Site Location Details:	
GPS Coordinates		
Lat:	Long:	
<ol style="list-style-type: none"> 6. Notify the Control Centre of Emergency – 1-888-876-6711. 		
Emergency Equipment:		
<input type="checkbox"/> Life Jackets / PFD's <input type="checkbox"/> Rescue Pole <input type="checkbox"/> Radios – Channel _____ <input type="checkbox"/> Intrinsically Safe Cell Phone <input type="checkbox"/> Stretcher <input type="checkbox"/> Harnesses <input type="checkbox"/> Rescue Rope Throw Bags <input type="checkbox"/> Other _____		
Rescue Plan		
<ol style="list-style-type: none"> 1. Rescuers assess the situation – only enter if it can be done safely, if not, utilize rescue equipment. 2. Two rescuers to retrieve victim using rescue pole. Move the victim horizontally to location for evacuation. Use stretcher to move victim, if necessary. 3. Move victim to a safe/warm location and have First Aid Attendant offer treatment until assistance arrives. 		
Supervisor Signature:	Phone #:	
Report Completed By:	Date:	

INITIAL SITE HEALTH & SAFETY PLAN

INCIDENT PARTICULARS					
Incident Name:			Date/ Time:		
Pipeline: <input type="checkbox"/> Line 1 <input type="checkbox"/> Line 2 <input type="checkbox"/> Puget			Initial Incident Commander:		Phone #:
Command Post Location:					
Product:	Est. Vol:	m ³ barrels	SDS Available: <input type="checkbox"/> Yes <input type="checkbox"/> No		
ICS 201 Form Initiated: <input type="checkbox"/> Yes <input type="checkbox"/> No			Person Responsible:		
Internal/ External Notifications Made: <input type="checkbox"/> Yes <input type="checkbox"/> No			Person Responsible:		
SITE CHARACTERIZATION					
<input type="checkbox"/> Common ROW Line1/2	<input type="checkbox"/> Diverged ROW Line1/2	<input type="checkbox"/> Storage Facility	<input type="checkbox"/> Berth	<input type="checkbox"/> Water	<input type="checkbox"/> Land
<input type="checkbox"/> Other (please specify)					
SITE SECURITY & ACCESS POINTS					
Description:					
SITE HAZARDS					
<input type="checkbox"/> Fire Explosion	<input type="checkbox"/> Equipment Operations	<input type="checkbox"/> Trenching Excavation	<input type="checkbox"/> Fatigue	<input type="checkbox"/> Slips, Trips, and Falls	
<input type="checkbox"/> Chemicals	<input type="checkbox"/> Motor Vehicles	<input type="checkbox"/> Confined Spaces	<input type="checkbox"/> Heat Stress	<input type="checkbox"/> Restricted Work Area	
<input type="checkbox"/> Electrical	<input type="checkbox"/> Boat Operations	<input type="checkbox"/> UV Radiation	<input type="checkbox"/> Cold Stress	<input type="checkbox"/> Heavy Lifting	
<input type="checkbox"/> Steam/ Hot Water	<input type="checkbox"/> Helicopter Operations	<input type="checkbox"/> Overhead/ Buried Utilities	<input type="checkbox"/> Weather	<input type="checkbox"/> Drum Handling	
<input type="checkbox"/> Noise	<input type="checkbox"/> Shore Line Operations	<input type="checkbox"/> Pumps and Hoses	<input type="checkbox"/> Visibility	<input type="checkbox"/> Plants/Wildlife	
<input type="checkbox"/> Other:					
ATMOSPHERIC MONITORING – INITIAL READING					
O ₂	%	LEL	%	Other (specify):	
H ₂ S	ppm	Benzene	ppm		
NOTE: Additional results to be recorded in 'Emergency Response/ Safety Watch Log'					
CONTROL MEASURES			SITE SETUP		
<input type="checkbox"/> Source of Release Secured			Communications Established <input type="checkbox"/> Yes <input type="checkbox"/> No		
<input type="checkbox"/> Site Secured			Hot Zone Established <input type="checkbox"/> Yes <input type="checkbox"/> No		
<input type="checkbox"/> Valve(s) Closed			Fire Extinguisher Accessible <input type="checkbox"/> Yes <input type="checkbox"/> No		
<input type="checkbox"/> Energy Sources Locked/ Tagged Out			Decontamination Stations Established <input type="checkbox"/> Yes <input type="checkbox"/> No		
<input type="checkbox"/> Facility Shut Down			Illumination Equipment Provided <input type="checkbox"/> Yes <input type="checkbox"/> No		
<input type="checkbox"/> Other:			Medical Surveillance Provided <input type="checkbox"/> Yes <input type="checkbox"/> No		
			Sanitation Facilities Provided <input type="checkbox"/> Yes <input type="checkbox"/> No		
HOT ZONE PPE REQUIREMENTS					
General		Other		Respiratory	
<input type="checkbox"/> Hard Hat	<input type="checkbox"/> Face Shield	<input type="checkbox"/> Rubber boots	<input type="checkbox"/> Leather gloves	<input type="checkbox"/> SABA/ Air Line w/ Esc	
<input type="checkbox"/> FR Clothing	<input type="checkbox"/> Tinted Lens	<input type="checkbox"/> High Vis. Vests	<input type="checkbox"/> Nitrile gloves	<input type="checkbox"/> SCBA to be worn	
<input type="checkbox"/> Steel toes	<input type="checkbox"/> Impact Goggles	<input type="checkbox"/> PFD's (within 1m of shoreline)	<input type="checkbox"/> Rubber gloves	<input type="checkbox"/> SCBA to be avail. #	
<input type="checkbox"/> Safety Glasses	<input type="checkbox"/> Chemical Res. Clothing	<input type="checkbox"/> Safety Harness	<input type="checkbox"/> Hearing Protection	<input type="checkbox"/> Air Purifying (full mask)	
<input type="checkbox"/> Turnout Gear		<input type="checkbox"/> FR Rain Gear	<input type="checkbox"/> FR Tyvek	<input type="checkbox"/> Air Purifying (half mask)	
				<input type="checkbox"/> Cartridge Type	OV
				<input type="checkbox"/> Cartridge Type	P(M)-100
				<input type="checkbox"/> Cartridge Type	P(M)-100/OV
WARM ZONE PPE REQUIREMENTS					
General		Other		Respiratory	
<input type="checkbox"/> Hard Hat	<input type="checkbox"/> Face Shield	<input type="checkbox"/> Rubber boots	<input type="checkbox"/> Leather gloves	<input type="checkbox"/> SABA/ Air Line w/ Esc	
<input type="checkbox"/> FR Clothing	<input type="checkbox"/> Tinted Lens	<input type="checkbox"/> High Vis. Vests	<input type="checkbox"/> Nitrile gloves	<input type="checkbox"/> SCBA to be worn	
<input type="checkbox"/> Steel toes	<input type="checkbox"/> Impact Goggles	<input type="checkbox"/> PFD's (within 1m of shoreline)	<input type="checkbox"/> Rubber gloves	<input type="checkbox"/> SCBA to be avail. #	
<input type="checkbox"/> Safety Glasses	<input type="checkbox"/> Chemical Res. Clothing	<input type="checkbox"/> Safety Harness	<input type="checkbox"/> Hearing Protection	<input type="checkbox"/> Air Purifying (full mask)	
		<input type="checkbox"/> FR Rain Gear	<input type="checkbox"/> FR Tyvek	<input type="checkbox"/> Air Purifying (half mask)	
				<input type="checkbox"/> Cartridge Type	OV
				<input type="checkbox"/> Cartridge Type	P(M)-100
				<input type="checkbox"/> Cartridge Type	P(M)-100/OV
TRAINING AND REVIEW					
Hazwoper Training Records Verified for U.S.A. Operations <input type="checkbox"/> Yes <input type="checkbox"/> No			All Responders have reviewed this Plan <input type="checkbox"/> Yes <input type="checkbox"/> No		
Completed by:					

TRANS MOUNTAIN ICE ASSESSMENT FORM

Date:		Location (Control Point):		GPS Coordinates:	
Completed by:					
Climate Condition: Calm/Snow/Rain/Wind		List Names of Responders Present or use 211p Form		3)	
Visibility Factors: Clear/Fog/Light/Dark		1)		4)	
Today's Temperature: _____0 C		2)		5)	
Ice Measurement Data					
Ice Measurement Data		Control Record		Yes	No
Hole Distances Are Measured		Tailgate Meeting Completed			
From the east/north to west/ south shore		ISHSP/Comms & Rescue Plan Completed			
		Environment River Forecast Reviewed			
Test Hole #	Ice Depth	Safety Signs in Correct Position			
#1-	cm/inches	Safety Signs Clean/Visible			
#2-	cm/inches	Barricades in Correct Position			
#3	cm/inches	Test Holes—Staked & Numbered			
#4	cm/inches	Work Area Clear of Snow			
#5	cm/inches	Access Path Surface Visible			
#6	cm/inches	Unusual or Deep Cracks Observed			
#7	cm/inches	Water Visible in Cracks			
#8	cm/inches	Thin Ice On/Near Shoreline			
#9	cm/inches	Shore Inspection: Water on Surface—Shore Ice Lifting or Bulging—Shore Ice Falling or Dropping—Shore Ice Bulging/Breaking Up Stream—Water on Surface Up Stream			
#10	cm/inches				
#11	cm/inches	Ice Weight Bearing Capacity Data			
#12	cm/inches	Yesterday's Load Capacity Rating: _____KG			
#13	cm/inches	Today's Load Capacity Rating: _____KG			
#14	cm/inches	List Potential Problems Developing on Work Area or Up Stream:			
#15	cm/inches				
#16	cm/inches				
#17	cm/inches	Gold's Formula - $P = A \times h^2$ where: P is the calculated allowable load in kilograms, A is the selected risk tolerance value, h is the effective thickness of good quality blue/white ice (cm) Refer to Section 4.4.2 of this manual for instructions in completing the formula.			
#18	cm/inches				
#19	cm/inches				
#20	cm/inches	List Name (s) of Persons Notified			List Time of Notification
#21	cm/inches	1) On-scene Supervisor:			am/pm
#22	cm/inches	2) Safety Officer (Incident Command):			am/pm
#23	cm/inches	3) Safety Watch:			am/pm
#24	cm/inches	4) Rescue Team:			am/pm
#25	cm/inches	5)Environment Unit:			am/pm

SITE DIAGRAM

