"EXTREME" COLD WEATHER ©

OIL SPILL RESPONSE TECHNIQUES

By

Carl J. Oskins

DOWCAR Environmental Management, Inc.

QUESTION:

- WHY CONDUCT
- WHY TRAIN for
- WHY PLAN for
- WHY OBTAIN EQUIPMENT for
- and WHY PRACTICE for

"EXTEME" COLD WEATHER OIL SPILL RESPONSE ?

WHY CONDUCT "EXTREME" COLD WEATHER OIL SPILL RESPONSE ?

APPLICABLE GOVERNMENTAL REGULATIONS:

Under EPA, USCG, DOT-PHMSA, MMS Oil Pollution Regulations for Facility Response Plans, the *FINAL RULE REQUIRES*:

Owners or Operator of *"SUBSTANTIAL HARM FACILITIES"* Must Prepare Facility Plans to Respond to a *WORST CASE OIL SPILL DISCHARGE* and Small and Medium Discharge as Appropriate.

Under Public Law 101-380-August 18, 1990 - *OIL POLLUTION ACT of 1990*. OPA Section 4201 (b) 9CWA Section 311 (a) (24) Defines a:

***"WORST CASE DISCHARGE"* for a Facility as the Largest Foreseeable Discharge in the *MOST ADVERSE WEATHER CONDITIONS*.**

WHY CONDUCT "EXTREME" COLD WEATHER OIL SPILL RESPONSE ? (cont.)

" ADVERSE WEATHER CONDITIONS " is defined as:

The WEATHER CONDITIONS that makes it Difficult for Response Equipment and Personnel to Clean up or Remove Spilled Oil.

FACTORS to CONSIDER INCLUDE:

- SIGNIFICANT WAVE HEIGHT,
- ICE CONDITIONS,
- TEMPERATURES,
- WEATHER-RELATED VISIBILITY
- and CURRENTS.

WHY TRAIN for "EXTREME" COLD WEATHER OIL SPILL RESPONSE ?

ANSWER:

EPA 40 CFR Part 112: - ***Oil Pollution Prevention; Non-Transportation-Related Onshore Facilities; Final Rule.***

112.21 – Facility Response Training and Drills/Exercises.

(a) The Owner or Operator of any Facility Required to Prepare a Facility Response Plan under 112.20 Shall Develop & Implement a Facility Response Training Program.

WHY TRAIN for "EXTREME" COLD WEATHER OIL SPILL RESPONSE ? (cont.)

(b) The Facility Owner or Operator Shall Develop a Facility Response Training Program to Train those Personnel Involved in Oil Spill Response Activities.

(1) The Owner or Operator Shall be Responsible for the Proper Instruction of Facility Personnel in the Procedures to Respond to a Discharge of Oil and in Applicable Oil Spill Response Laws, Rules, and Regulations.

(2) Training Shall be Functional in Nature According to Job Tasks for Both Supervisory and Non-Supervisory Operational Personnel.

WHY TRAIN for "EXTREME" COLD WEATHER OIL SPILL RESPONSE? (cont.)

If You Have An Extreme Cold Weather Environment and a Facility Response Plan then

" IT'S REQUIRED "

WHY PLAN for "EXTREME" COLD WEATHER OIL SPILL RESPONSE ?

ANSWER:

If you have an *FRP* and you have an *Applicable Operating Environment* that has a *Winter Season* of:

- ***ICE,***
- ***SNOW,***
- ***FREEZING & SUB-FREEZING TEMPERATURES,***
- ***FROZEN LAKES, STREAMS & RIVERS***

then you *HAVE MET* the Requirement, to Plan for a *Worst Case*, *Medium & Small Spill* in *ADVERSE WEATHER CONDITIONS* such as *"EXTREME" COLD WEATHER*.

IN "EXTREME" COLD WEATHER OIL SPILL RESPONSE

WHAT DO WE PLAN FOR ?

- *The Amount of Oil the Plan Holder Anticipates will Reach:*

  - *Frozen Streams,*
  - *Lakes,*
  - *Rivers and*
  - *Snow Covered Land Environments.*

- *What Spill Trajectory Does the Plan Holder Think the Oil Will Take.*

  - *When it is Spilled on the Ice*
  - *and/or Snow?*

- *How is the Plan Holder Going to Determine How Much Oil is :*

  - *On the Snow,*
  - *On the Ice,*
  - *In the Ice,*
  - *Under the Ice?*

IN "EXTREME" COLD WEATHER OIL SPILL RESPONSE - WHAT DO WE PLAN FOR ? (cont.)

- *What Oil Spill Response Strategy is going to be Selected?*
  - *Do Nothing*
  - *Wait Till Spring*
  - *Contain with Ice/Snow Berms & Trenches*
  - *Conduct Ice Slotting Containment Operations*

- *Once Contained, How are we going to Recover the Oil from:*
  - *the Ice,*
  - *Snow and/or*
  - *Ice Slot*

- *Once we know where the Oil is Going and How Fast it is Traveling,*
  - *How,*
  - *When &*
  - *Where Does the Plan Holder, Plan for Locating the Containment & Recovery Sites?*

- *Are the Containment and Recovery Sites Pre-Planned?*

IN "EXTREME" COLD WEATHER OIL SPILL RESPONSE - WHAT DO WE PLAN FOR ? (cont.)

- *What Will the Plan Holder's First Responders Requirements Be and Where is the Plan Holder Going to Get Them?*

- *What Extreme Cold Weather Oil Spill Response Equipment will the Plan Holder be Required to Obtain to Successfully Contain, Recover & Clean up the Potential Discharge of Oil?*

  - *Will the Plan Holder Pre-Purchase the Required Equipment?*
  - *Where Will they Obtain the Required Equipment?*
    (MOST EQUIPMENT is NOT OFF the SHELF)

- *What Decontamination Procedures will be Determined & Conducted for this Extreme Cold Weather Environment?*

  - *What Equipment will be Selected & Purchased?*
  - *Where will the Equipment be Obtained from?*
  - *Who will Conduct the Decontamination?*
  - *What Training will they Receive for this type of Decon?*

The HARD WAY with NO PLANNING

COLD & FROZEN WATER OIL SPILLS

General Background

GENERAL BACKGROUND

- DIFFICULT to FIND OIL
- DIFFICULT to CONTAIN OIL
- DIFFICULT to RECOVER OIL
- SAFETY CONCERNS with TEMPERATURE, WEATHER & COLD WATER
- FEW PROPERLY TRAINED RESPONDER PERSONNEL
- EQUIPMENT DIFFICULT to OBTAIN & MAINTAIN
- LITTLE RESEARCH into EXTREME COLD WEATHER OIL SPILL RESPONSE
- MOST COMPANIES IGNORE

WHERE to FIND the SPILLED OIL in EXTREME COLD WEATHER

OIL in SLUSH

(Freeze Up)

OIL in SNOW

OIL ENCAPSULATED in SOLID ICE

OIL UNDER SOLID ICE

(Over Rotting Ice)

OIL in BROKEN ICE

(Breakup)

COLD WEATHER PERSONAL PROTECTIVE EQUIPMENT

Cold Weather Safety

COLD WEATHER INJURIES

3 FACTORS INVOLVED in a COLD CHALLENGE to the HUMAN BODY

- TEMPERATURE
- WIND
- WET CONDITIONS

ALL 3 EFFECT the RATE of HEAT LOSS from a PERSON'S BODY

CLOTHING for FIELD OPERATIONS

A SYSTEM of 3 LAYERS and HAND, HEAD and FOOT PROTECTION

- **BASE (INNER) LAYER**

(WICKS MOISTURE AWAY FROM SKIN)

- **MIDDLE WEAR (INSULATING) LAYER**

(POSSIBLY SEVERAL LAYERS)

- **WATERPROOF OUTER LAYER**

(PROTECTION FROM WIND, RAIN & SNOW)

OTHER CONCERNS in "EXTREME" COLD WEATHER

- WATER CONSUMPTION
- BUDDY SYSTEM
- SAFETY & EQUIPMENT
- CHECKLISTS

HARNESS, HARD HATS, LIFE JACKETS & LAYERED COLD WEATHER CLOTHING

SAFETY LINES on HARNESSES

BOOT SAFETY for WORK on ICE

BOOT SNOW &
ICE TRACTION CHAINS

STABILICER ANTI-SKID SOLES

ICE & SNOW TRACTION CLEATS

ICE CHARACTERISTICS

&

OIL BEHAVIOR

TWO (2) TYPES of ICE:

- CLEAR ICE (BLUE ICE)
- WHITE ICE (SNOW ICE)

ICE CHARACTERISTICS (cont.)

CLEAR ICE is:

- CLEAR,
- WELL COMPRESSED,
- DOES NOT CONTAIN AIR POCKETS,
- IS VERY STRONG &
- HAS A HIGH LOAD-BEARING CAPACITY.

8 to 10 FT. CLEAR (LAKE) ICE BLOCKS with BEVELED SIDE CUTS

8 to 10 FT. CLEAR (LAKE) ICE BLOCKS with BEVELED SIDE CUTS

WHITE ICE:

- HAS MANY LAYERS of ICE & SNOW,
- HAS MANY AIR POCKETS,
- MUCH LOWER LOAD-BEARING CAPACITY
  - ½ as EFFECTIVE as CLEAR ICE,
- MAY HAVE LAYERS of SEDIMENTATION

WHITE (RIVER) ICE with LAYERS

WHITE & CLEAR RIVER ICE with LAYERS of SEDIMENTATION

WHITE (RIVER) ICE with LARGE LAYER with SEDIMENTAION

ICE SLOTTING TECHNIQUES

- *STANDARD ICE SLOT with "A" FRAMSE & HOIST*
- *BUCK'S CUT ICE SLOT with "Z" Rig Pull*
- *RODNEY'S ROLL*
- *JSG - ICE MITER SAW GUIDE with BUCK'S CUT & RODNEY'S ROLL*
- *DIVERSIONARY PLYWOOD SHEET BARRIER with COLLECTION SUMP*

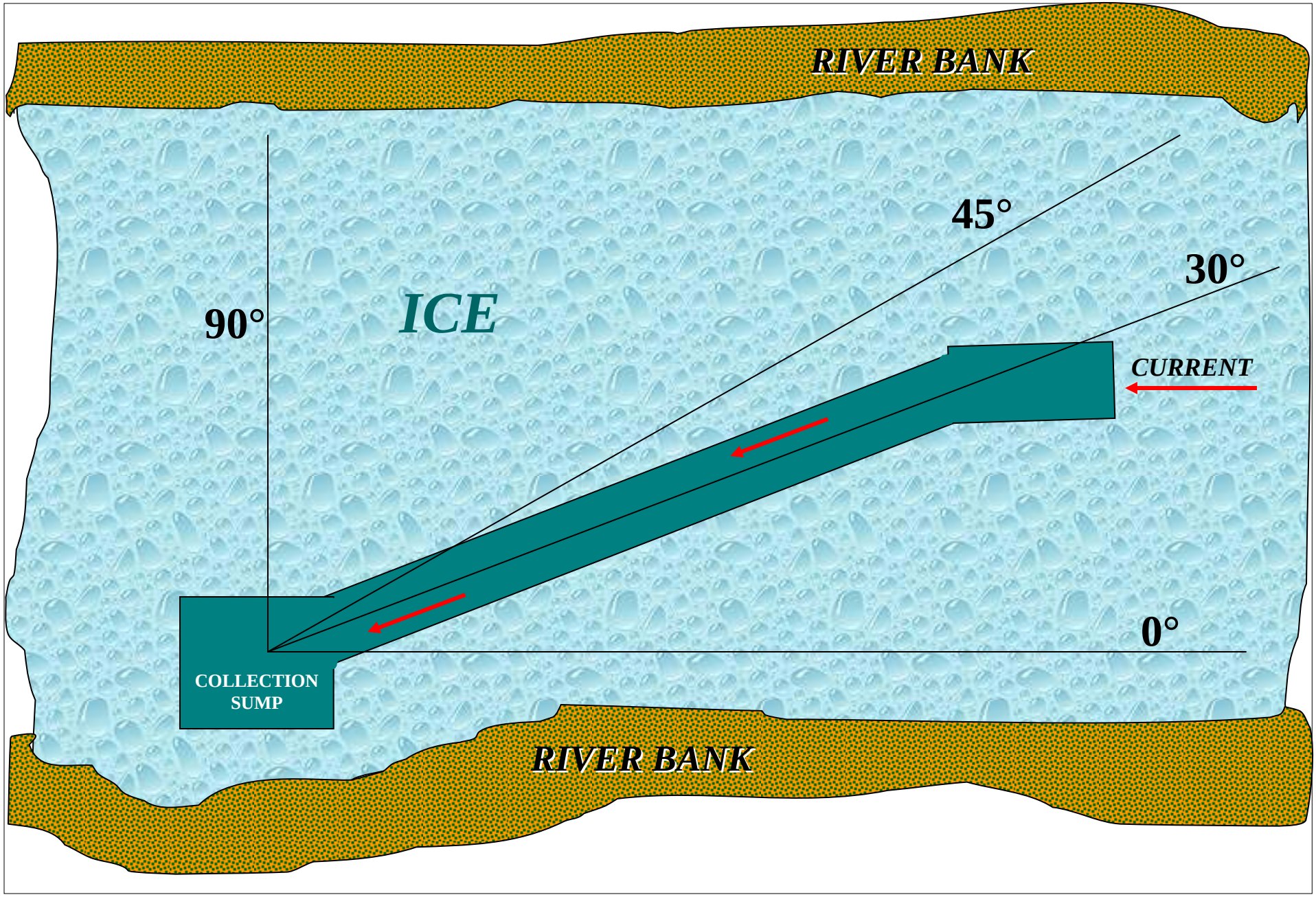
STANDARD ICE SLOT TECHNIQUES

STANDARD ICE SLOT TECHNIQUES

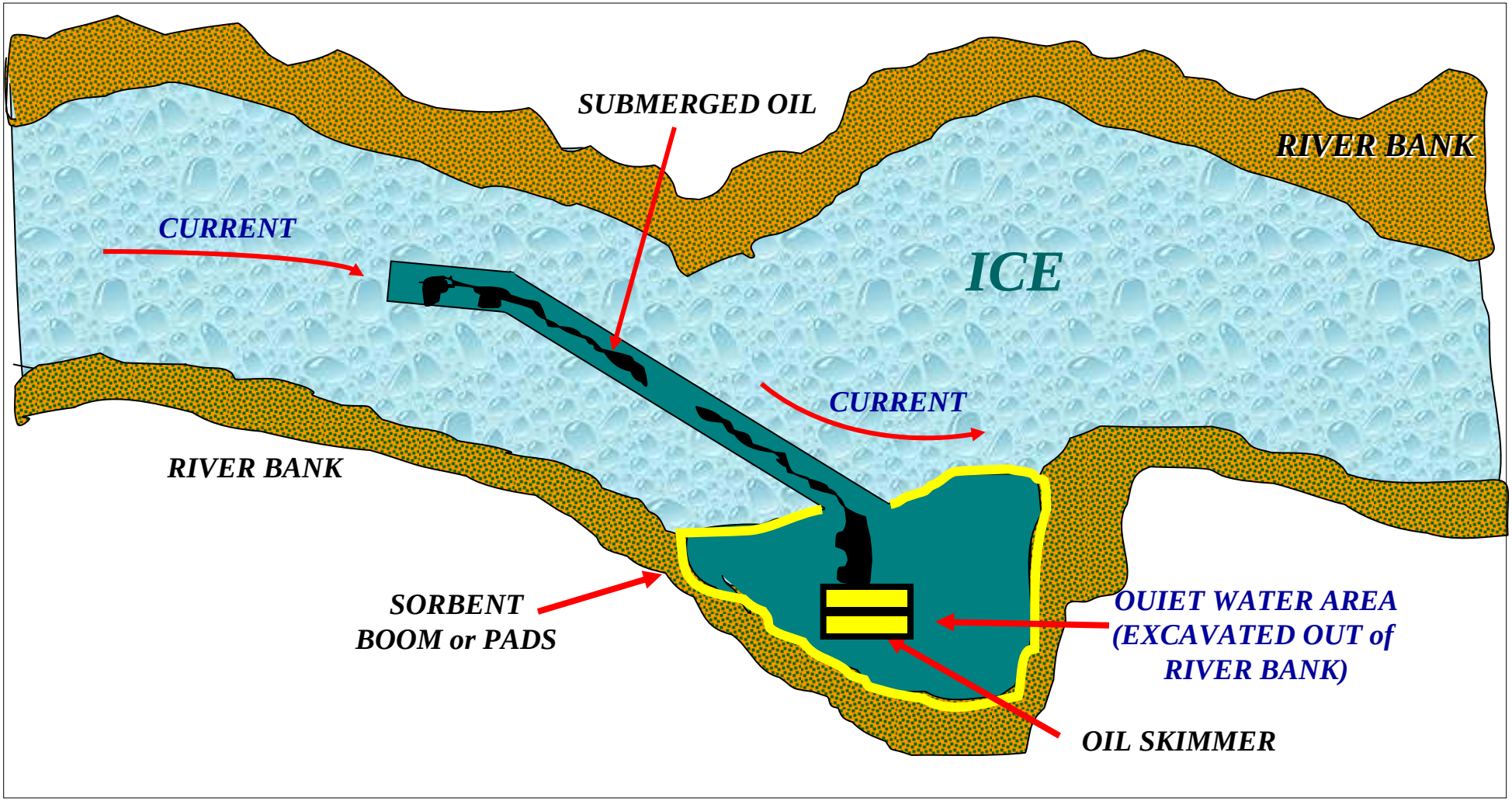
STANDARD ICE SLOT TECHNIQUES

- ICE SLOTS SHOULD BE CUT at a 20 to 30 DEGREE ANGLE into the RIVER CURRENT.
- ICE SLOT WIDTH IS 1.5 x ICE THICKNESS.
- ICE SLOT SHOULD BE CUT WITH A "J" CURVE ANGLE at the UPSTREAM END of the SLOT.
- ICE LOAD BEARING CAPACITY IS ½ the ICE THICKNESS x 50 SQUARED = PER SQ. FOOT.

STANDARD ICE SLOTTING LAYOUT



DIVERSION & CONTAINMENT of OIL MOVING BENEATH ICE



COMPLETED ICE SLOT

COMPLETED ICE SLOT - CLEAR (LAKE ICE)

ICE SLOTTING EQUIPMENT

- DITCH WITCH,
- BACKHOE,
- CHAIN SAWS,
- ICE AUGERS,
- "A" FRAME HOIST,
- JSG MITER CHAIN SAW GUIDE
- HAND ICE SAW &
- HAND TOOLS

USE of DITCH WITCH

USE of DITCH WITCH

BACK HOE

STEP 1. - INSPECT ICE for CRACKS & DETERMINE ICE SLOT POSITION

STEP 2. - DRILL AUGER HOLES to DETERMINE ICE THICKNESS & WATER DEPTH BELOW the ICE

STEP 3. - LAYOUT ICE SLOT DESIGN with PAINT, CAULK or ETCH

STEP 3. -
LAYOUT ICE SLOT DESIGN by CHAIN SAW ETCHING

STEP 4. -

ICE SLOT OUTLINED with SQUARE PATTERN & AUGER HOLES DRILLED in END SQUARE PRIOR to CUTTING SLOTS.

STEP 5. - CONSTANT CLEANING of ICE & SNOW from ICE SLOT DESIGNS

STEP 6. - CUTTING of SIDES of ICE SLOT DESIGN

STEP 7. - LIFTING of 1st ICE BLOCK with "A" FRAME & HOIST

STEP 8. -

LIFTING of 1st ICE BLOCK with "A" FRAME & HOIST & PUSHING ICE to SIDE

STEP 9. – LIFTING of 2nd ICE BLOCK with "A" FRAME & HOIST & "T" BAR

" BUCK'S CUT "
ICE SLOT TECHNIQUES

with "Z" Rig Pull

DRILLING 1st AUGER HOLE to DETERMINE ICE THICKNESS, WATER DEPTH & LOAD BEARING CAPACITY

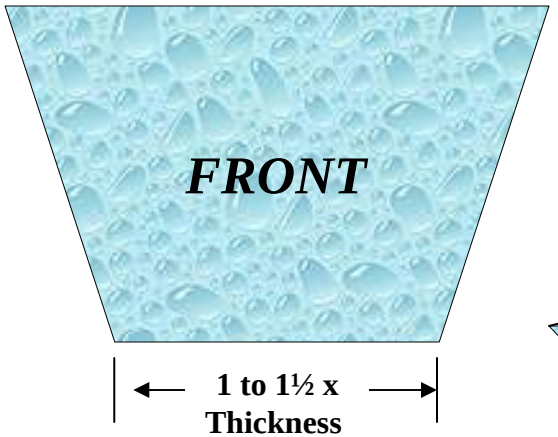
HORIZONTAL LINES BEING ETCHED on ICE with PLYWOOD SAFETY WALK SHEETS

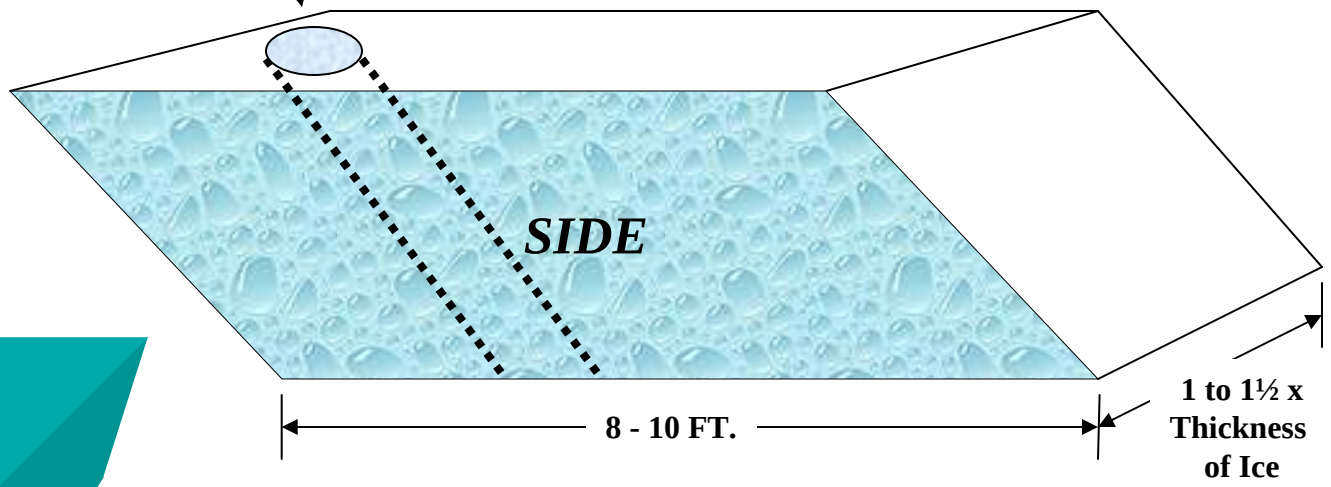
HORIZONTAL LINES BEING ETCHED on ICE FOLLOWING ROPE

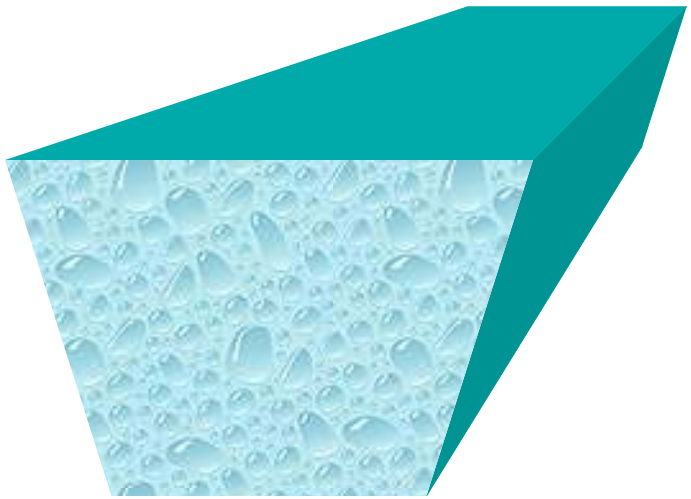
VERTICAL LINES BEING ETCHED on ICE with PLYWOOD SAFETY WALK SHEETS

LAYING OUT the ICE SLOT PATTERN with CHAIN SAW

ICE BLOCKS CUT AT THESE ANGLES for BUCK'S CUT - THEN PULLED OUT WITH "Z" RIG SYSTEM







DRILLING AUGER HOLES & CUTTING 1ST ICE BLOCK

2nd ICE BLOCK BEING CUT with CHAIN SAWS in OPPOSITE DIRECTIONS

2nd ICE BLOCK BEING CUT with CHAIN & HAND SAWS

ATTACHING "T" BAR in REVERSE METHOD

2nd ICE BLOCK BEING PULLED OUT with "Z" RIG METHOD

4" x 4" x 6' USED as ANCHOR POST for "Z" RIG to HAUL 8' to 10' ICE BLOCK from ICE SLOT

POWER WENCH USED to PULL ICE BLOCK with "Z" RIG

"Z" RIG BEING USED to HAUL ICE BLOCKS

LAST ICE BLOCK BEING REMOVED

8 to 10' ICE BLOCK BEING HAULED OUT with "Z" RIG

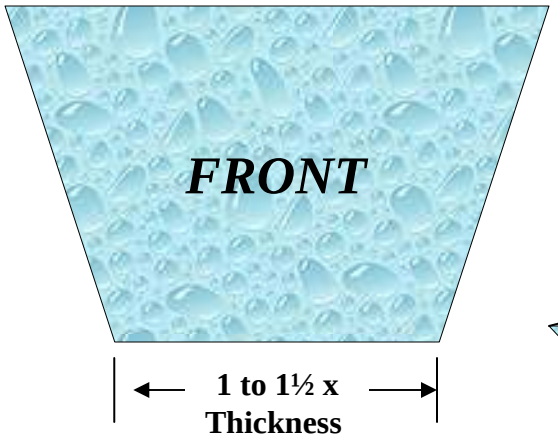
8 to 10' ICE BLOCK BEING HAULED OUT with "Z" RIG

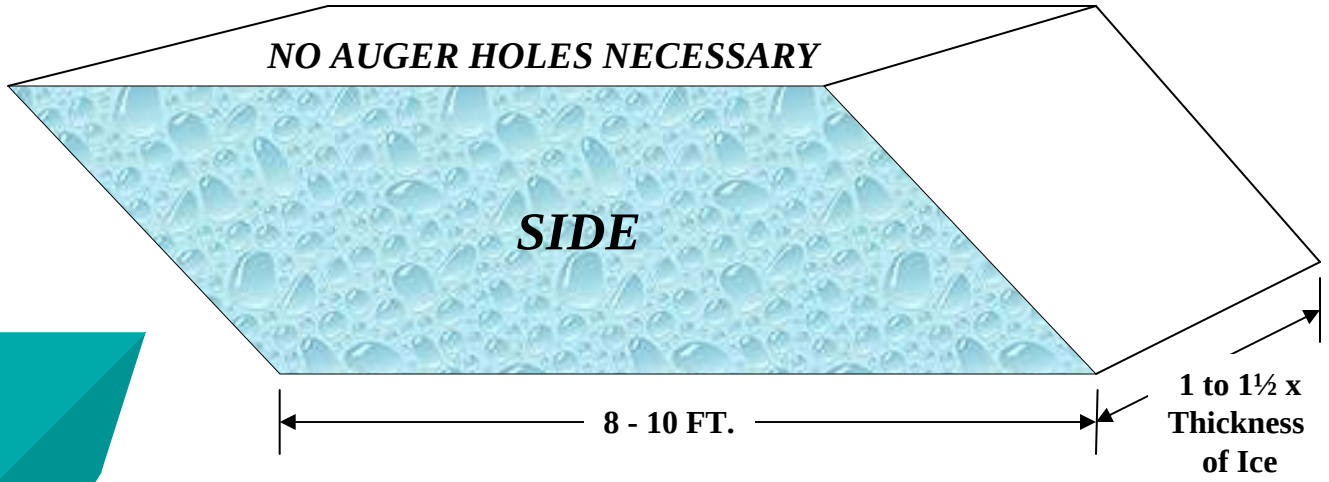
COMPLETED ICE SLOT USING BUCK'S CUT METHOD

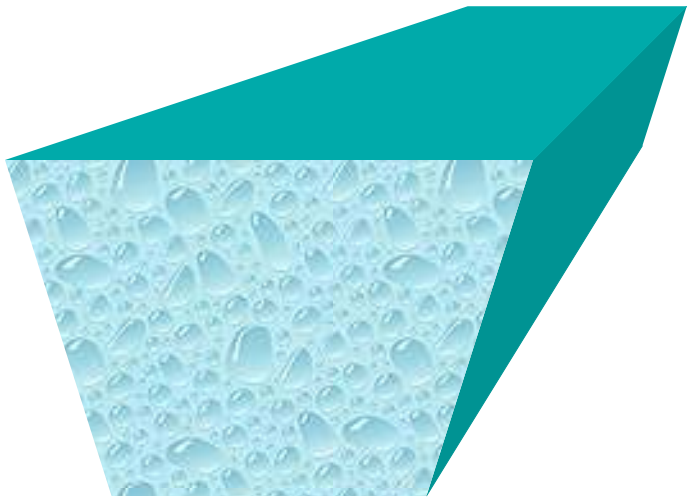
"RODNEY'S ROLL"

Use of Pry Bars to Lift & Move Ice Blocks to Side

ICE BLOCKS CUT AT THESE ANGLES for RODNEY'S ROLL



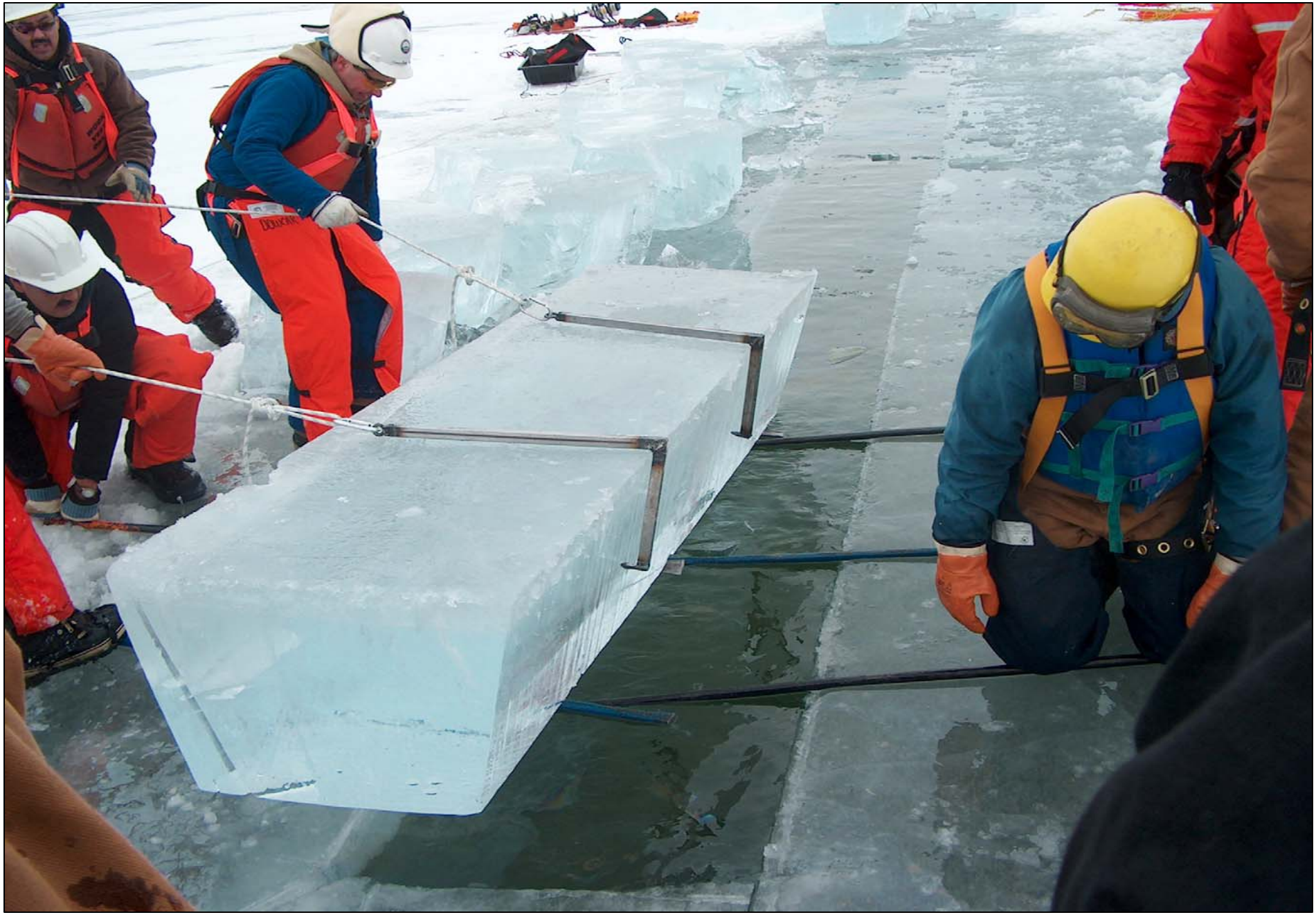




" RODNEY'S ROLL " - USING PRY BARS to LIFT & MOVE ICE BLOCKS to SIDE

"RODNEY'S ROLL" - USING PRY BARS to LIFT & MOVE ICE BLOCKS to SIDE

" RODNEY'S ROLL " - 10' ICE BLOCK with ICE BLOCK GRIPPERS



COMPLETED ICE SLOT USING " RODNEY'S ROLL "

" RODNEY'S ROLL " - COMPLETED ICE SLOT, CLEAR (LAKE) ICE

JANICKE SLOTTING GUIDE

ICE MITER CHAIN SAW GUIDE

JANICKE SLOTTING GUIDE (JSG) - NITIAL ICE MITER CHAIN SAW GUIDE

JANICKE SLOTTING GUIDE (JSG) - ICE MITER CHAIN SAW GUIDE CUTTING ICE

JANICKE SLOTTING GUIDE (JSG) - ICE MITER CHAIN SAW GUIDE CUTTING ICE

JSG -
ICE MITER CHAIN SAW GUIDE CUTTING ICE

JANICKE SLOTTING GUIDE (JSG) - UPDATED ICE MITER CHAIN SAW GUIDE CUTTING ICE

JANICKE SLOTTING GUIDE (JSG) - UPDATED ICE MITER CHAIN SAW GUIDE CUTTING ICE

COMPLETED ICE SLOT USING JSG

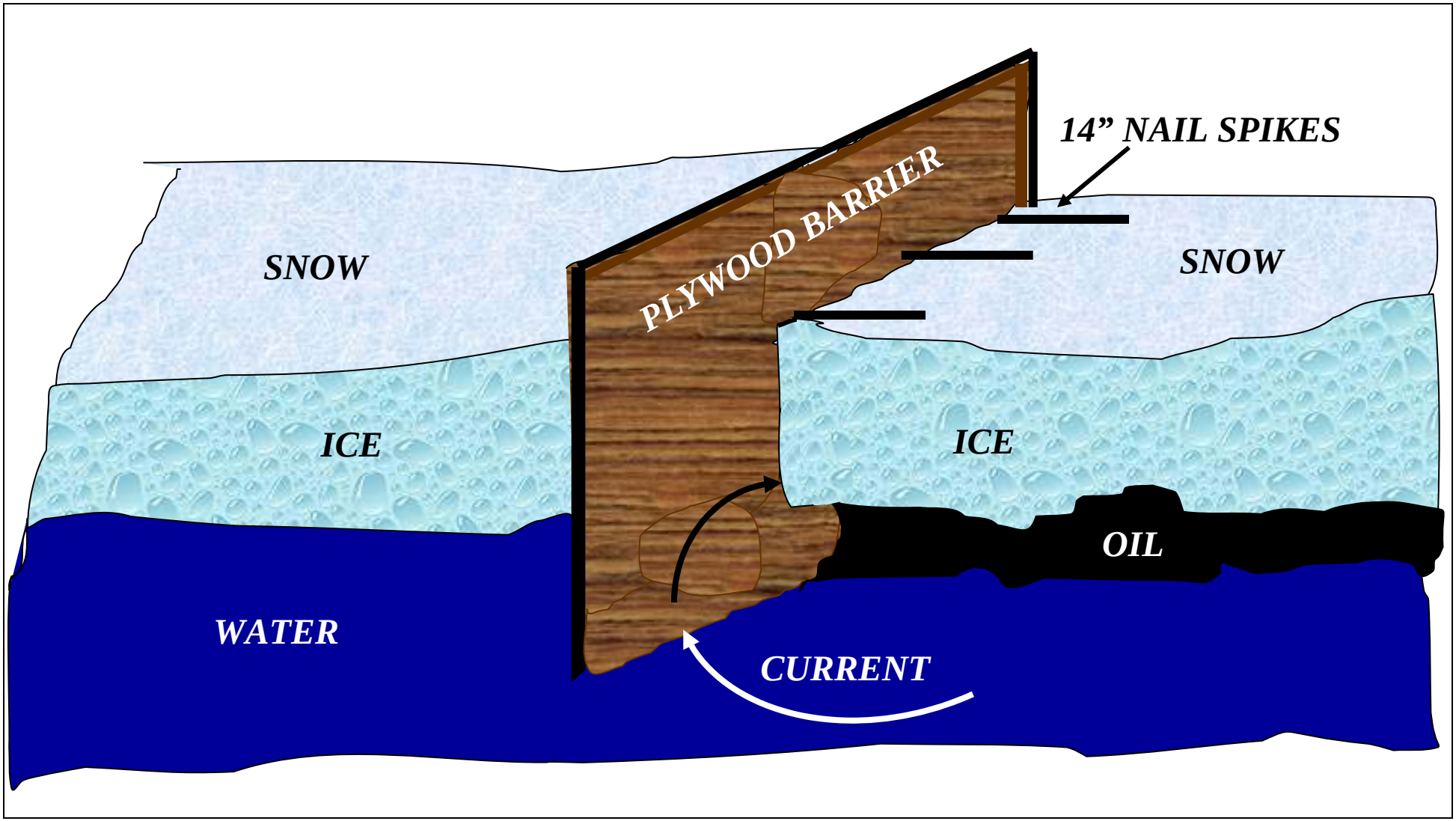
COMPLETED ICE SLOT USING JSG

" DIVERSIONARY "
THRU ICE
PLYWOOD SHEETS

---

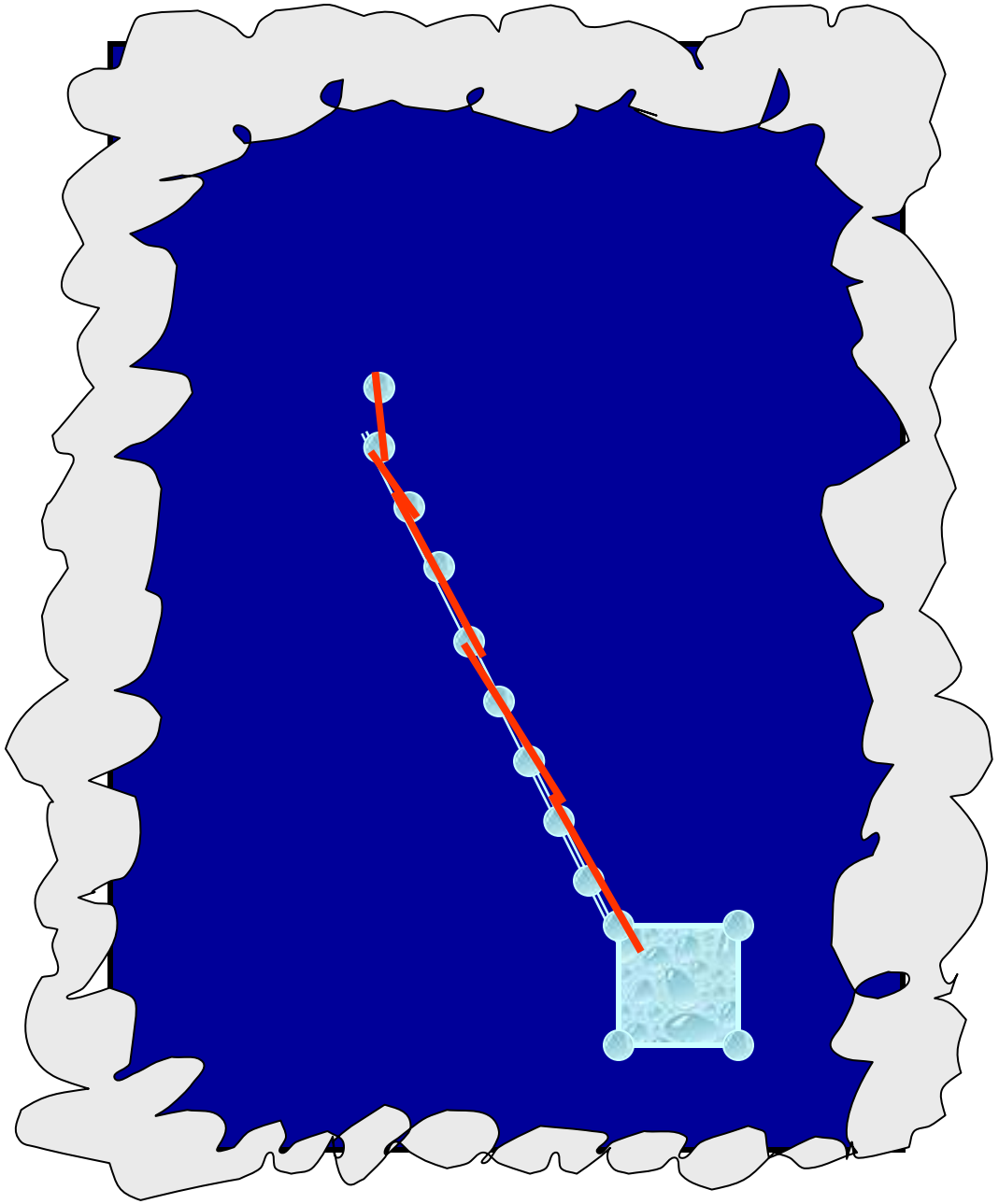
with OIL COLLECTION SUMP

THROUGH ICE BARRIER



"DIVERSION" THRU ICE PLYWOOD SHEET BARRIER

"DIVERSION"
THRU ICE PLYWOOD SHEET BARRIER



LAYING OUT "DIVERSION" PLYWOOD SHEET BARRIER with ROPE

ETCHING BARRIER PATTERN with CHAIN SAW

DRILLING AUGER HOLES ALONG LAYOUT GUIDE LINE

AUGER HOLES COMPLETED on PLYWOOD SHEET BARRIER GUIDELINES

ATTACHING AUGER HOLES

ATTACHING AUGER HOLES USING HAND SAW

1st PLYWOOD SHEET with SPIKES to STABILIZE it on ICE

2nd PLYWOOD SHEET PLACED in ICE with OVERLAP

PLYWOOD SHEET BEING PLACED in "J" PORTION of THRU ICE BARRIER

PLYWOOD SHEET BEING PLACED in "J" PORTION of THRU ICE BARRIER

CONCLUSIONS:

DO WE NEED to PLAN for "EXTREME" COLD WEATHER OIL SPILL RESPONSE

- YES, YES, YES !!!

WHAT DO WE NEED TO PLAN FOR?

- PLAN FOR TRAINING NEEDS;
- PLAN FOR MANPOWER & EQUIPMENT NEEDS;
- PLAN FOR & ESTABLISH PREDESIGNATED CONTAINMENT & RECOVERY SITES on INLAND WATERWAYS in QUESTION;
- PLAN FOR & ESTABLISH A DISPOSAL PLAN FOR RECOVERED OIL & DEBRIS;
- PLAN FOR & ESTABLISH DECONTAMINATION PLANS;
- PLAN FOR & PRACTICE, PRACTICE & PRACTICE !!!