WORKING ON, IN OR AROUND WATER, ICE & SOFT GROUND

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The following is a step by step procedure on how to complete a specific task or meet a facility specific requirement. Standard Operating Procedures (SOPs) are written for all identified critical tasks. By virtue of the hazard or complexity associated with critical tasks it is paramount that the SOP be followed as written. SOPs contain a listing of high-level hazards associated with the task, for detailed hazard analysis reference the applicable Task Hazard Assessments. SOPs do not replace the requirements contained in the company Standards, Codes, and Processes nor does it replace the need to comply with required legislation. Section 8.0 references documentation that the worker shall understand before work commences.

1.0 PURPOSE

- To establish a Company standard to safely and effectively carry out work as it applies to working on, in or around water and in soft ground.

2.0 SCOPE AND APPLICATION

- This document applies to all Company Heavy Construction Mining operations. Ensure all site-specific requirements are being met or exceeded before performing the task.

3.0 HAZARDS AND CONTROLS

- **Working in water less than one (1) metre deep** creating a potential for drowning due to a fall or equipment cab submersion.
    - Complete a hazard assessment (i.e. JSA) for the task. Hazard assessment must be reviewed and approved by supervision.
        - If a risk of drowning exists, working alone is not permitted. A spotter or shore watch person must be present. Spotter must have access to emergency services.
        - If a risk of drowning exists, personnel on foot must wear life jacket or personal floatation device.
        - If risk of drowning exists, an Emergency Rescue Plan must be developed for the task.
    - Equipment must have a seatbelt cutting tool as well as a window breaker tool. No bush guards or plexiglass windows permitted on equipment. Emergency hatches / roof hatches must be inspected and confirmed functional prior to equipment working near water. PFDs may be provided to operators as per the local legislation depending on the risk assessment by the supervisor or work area authority. Hydrostatic PFDs are not to be worn in equipment cabs.
    - Excavator operators will conduct a tri-directional bucket test before moving and periodically during work. The test will be in the direction of any travel as well as to both sides (10-12-2).

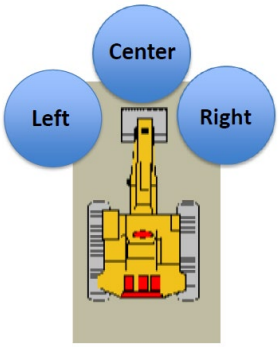
- **Equipment working around water greater than one (1) metre deep** creating a potential for drowning and equipment damage due to equipment sinking or becoming compromised.
    - Bodies of water greater than one (1) metre deep must be adequately marked with signage. Permission to work in area must be obtained from the area owner. Additional hazard assessment and or permit specific to the type of work may be required. Control zones may be required to identify safe work areas as identified in the hazard assessment.
    - **Equipment working in water greater than one (1) metre deep is not permitted.** Should a temporary task involve work in water greater than one (1) metre deep, an additional hazard assessment approved by site management is required.
    - Equipment will maintain a **safe distance from the water's edge that is equal to or greater than fifteen (15) metres**. Excavators may work within one (1) equipment length or five (5) metres to the water's edge providing the excavator is perpendicular to water with its final drive directed away or uphill. A spotter or shore watch person must be present and be able to communicate immediately with all nearby operators as well as with emergency services.
    - Operators should wear a seatbelt and must have a seatbelt cutting tool as well as a window breaker tool. No bush guards or plexiglass windows permitted on equipment working around water greater than (1) one metre deep. Emergency hatches / roof hatches must be inspected and confirmed functional prior to equipment working near water.
    - PFDs may be provided to operators as per the local legislation depending on the risk assessment by the supervisor or work area authority. Hydrostatic PFDs are not to be worn in equipment cabs.
    - Supervisors will inspect soil conditions above waterline to determine ground stability at start of shift and as conditions change. Instruct operators to test ground underwater using excavator bucket for depth and stability throughout the task.
    - Work area must have a defined access route for emergency and light vehicles. If an access route cannot be maintained for light vehicles, alternative equipment (i.e. amphibious all-terrain vehicle) must be designated and readily available for rescue.
    - Excavator operators will conduct a tri-directional bucket test periodically during work and in the direction of any travel as well as to both sides (10-12-2). This will be the control to maintain equipment stability when working near bodies of water as visual inspection through clouded water may be difficult or impossible.
        - If carrying a load (i.e. access mats), the excavator operator must travel the work area first without the load so that a tri-directional bucket test can be completed to confirm ground stability.
    - Use access mats (i.e. rig mats, swamp mats) in soft ground conditions to increase machine stability and to allow for site access. Ensure access mats are removed from the area after use. Only use mats that are in good condition and appropriate for the task.

- Use appropriately sized equipment for the task. Excavators working around water greater than one (1) metre deep should be less than 100T unless specified by a hazard assessment.
- A job or task specific emergency rescue plan must be developed for all work where equipment is working around water greater than one (1) metre deep. Rescue plan must consider the following:
  - Availability of first aid supplies and warming blankets as well as accessibility of life rings and throw bags.
  - Accessibility of suitably sized slings and shackles and appropriately sized equipment for heavy rescue operations. Equipment should be no further than 100 metres from work area.

- **Personnel working around water greater than one (1) metre deep** creating a potential for drowning due to falling into water either from same level or from height.
  - Personnel will maintain a safe distance from the water's edge that is equal to or greater than five (5) metres unless:
    - A berm equal to or greater than one (1) metre is in place, or
    - Physical barricades and or sufficient guardrails are in place preventing access to the water.
    - A life jacket or personal floatation device is worn, a spotter or shore watch person is present with access to emergency services and an emergency rescue plan is developed.
  - If work is being done at heights greater than 1.8 m, the above listed controls will apply in addition to the requirement of a fall protection system.

- Hidden water and soft ground conditions due to area being undisturbed and or covered in snow, ice, grass, bush, etc. causing equipment to become compromised.
  - Supervisor to identify water boundaries and wetland areas during daily hazard assessment. Use area scans such as surveys, drone footage, geotechnical assessments, etc. to determine potential for water areas. Use berms to protect equipment from danger areas. **Use pylons/delineators to mark water boundary where berm is not in place.**
  - All equipment must have a seatbelt cutting tool as well as a window breaker tool. No bush guards or plexiglass windows permitted on equipment if there is a potential to be working around water greater than (1) one metre deep. Emergency hatches / roof hatches must be inspected and confirmed functional prior.
  - PFDs may be provided to operators as per the local legislation depending on the risk assessment by the supervisor or work area authority. Hydrostatic PFDs are not to be worn in equipment cabs.
  - Visually inspect all areas before entering. Vegetation such as bulrushes, cattails and reedy grasses are indications that the ground below is swampy and soft. Water being forced to the surface is also an indication of pre-existing wetland or soft conditions. Notify supervision before going into area.

- Excavator operators must test ground conditions in advance of movement into new or covered areas to ensure the ground will support the machine. Test the ground using a tri-directional testing method. Use bucket down pressure to test left, right and center of the travel path.



- Equipment sinking in soft ground conditions.
  - Use access mats (i.e. rig mats, swamp mats) in soft ground conditions to increase machine stability. Ensure access mats are removed from the area after use. Only use mats that are in good condition and appropriate for the task.
  - If equipment begins to sink in soft ground conditions, the operator will immediately attempt to reverse out of the area. If they are unable to reverse, they will stabilize the low side of the machine by swinging to the direction the machine is sinking and applying downward pressure with the bucket to keep the cab above water and prevent it from taking on water. Contact supervision immediately.
  - Follow 962C-SOP-032 Recovery of Stuck or Immobile Equipment procedure should equipment become compromised.
- Equipment breaking through ice covered areas.
  - Working on ice with equipment is not permitted.
  - Ice covered areas must be broken up and the ground under the ice tested for load bearing strength. Permission to work in an ice-covered area must be authorized by a supervisor before proceeding and an additional hazard assessment completed. Follow controls referenced in this document if water exceeds (1) one metre deep.
- Light vehicles travelling through water or on ice covered areas.
  - Light vehicles will not travel over frozen bodies of water unless an ‘Ice Safety Plan’ and Emergency Response Plan has been developed by a competent person as well as authorization from the area owner has been obtained. The ice safety plan will include at a minimum:
    - description of task and duration,
    - GVW of all vehicles, tools, materials, fuel and people,

- type of water body,
- ice inspection and monitoring requirements,
- minimum allowable ice thickness,
- method to test ice thickness and maximum time allowed on ice.

Minimum allowable ice thicknesses for parked or slow-moving loads (GVW less than 5,000 kg) less than 2 hours on the ice is 38 cm or 15 inches. Anyone working on ice must be trained in ice safety and self-rescue techniques. The Ice Safety Plan must be approved by site management.

- Light vehicles will not travel through water or large puddles if the depth of the water is unknown and is likely to cause damage to the vehicle or cause it to become stuck.

- Working alone causing a delay in emergency response.
  - Working alone around, on or in water is not permitted.
- Soft, uneven surfaces causing workers to slip, trip, or fall.
  - Inspect ground conditions to determine ground stability before walking in area. Pay attention to foot placement so as to avoid ruts and slippery areas.
- Sloping banks towards open water.
  - Set up equipment on even ground, use blocks or access mats (i.e. rig mats, swamp mats) to stabilize equipment.
  - Excavators will not undercut material when digging near the water edge.
- Personnel falling into water while walking on ice covered bodies of water.
  - Walking on ice covered bodies of water is not permitted unless an 'Ice Safety Plan' and Emergency Response Plan has been developed as well as authorization from the area owner has been obtained. The ice safety plan will include at a minimum:
    - description of task and duration,
    - GVW of all vehicles, tools, materials, fuel and people,
    - type of water body,
    - ice inspection and monitoring requirements,
    - minimum allowable ice thickness,
    - method to test ice thickness and maximum time allowed on ice.

    Minimum allowable ice thicknesses to walk on ice is 10 cm or 4 inches. Anyone working on ice must be trained in ice safety and self-rescue techniques. The Ice Safety Plan must be approved by site management.

4.0 CHECKLIST

- ☐ Attend all preparatory meetings (IE: daily PSI; job scope; review of JSA's and SOP's for the job).
- ☐ Complete FLRA cards before starting the work.
- ☐ Ensure all personnel involved in the task are aware of the hazards and the controls to be used, as identified in the SOP's; JSA's; and FLRA's.
- ☐ Conduct a pre-job inspection of all equipment to be worked on and tools to be used.

5.0 DEFINITIONS

5.1 Deep Water

Any body of water that is:

- greater than 1 metre deep; or
- over the height of the tracks or tires of equipment; or
- a depth unable to determine visually.

5.2 Company

Means North American Construction Group Ltd. (NACG) and all directly or indirectly owned subsidiary companies, including joint ventures.

5.3 Company Personnel

Includes the Company's employees, officers, directors, agents, associates, consultants/contractors, temporary employees, and third-party processors.

5.4 HSE

Refers to the Health, Safety & Environment department.

6.0 PROCEDURE

1) Management to ensure that hazards and controls associated with water covered areas are outlined in a project hazard assessment or safe work plan prior to commencing project activity.

2) Project team will develop an emergency rescue plan if required for the scope of work and ensure appropriate rescue equipment is available.

3) Supervisor will inspect all work areas prior to assigning any task working near water or potential wetlands. Supervisor will ensure adequate controls such as but not limited to signage, berms, access mats, soil stability testing and dewatering have been completed or installed as needed.

4) Supervisor will review task with equipment operator or ground worker and ensure the worker understands the hazards, controls and scope of work.

5) Supervisor will designate a spotter or shore watch to be present while the equipment or ground person is working around water.

6) Supervisor will ensure adequate PPE and rescue equipment is available, if required based on hazard assessment.

7) Operator will complete a hazard assessment (i.e. FLRA) for the task and confirm communication devices (i.e. two-way radio) are working.

8) Operator will complete a pre-operation inspection of equipment and confirm that equipment has a rescue tool (seatbelt cutter and window hammer) as well as a life jacket or PFD if required. Operator will notify supervision of deficiencies.

9) Operator will test ground conditions before entering any area and before moving equipment in soft ground conditions or near areas of water.

10) Operator will work perpendicular to shoreline.

11) Operator will continually monitor for soft ground conditions and unexposed wetland areas.

12) Operator will break up any ice-covered areas and test ground stability before entering the area. Operator will not work on ice.

7.0 NOTES

If this task is to be done by a method different than described in this SOP, the work must **STOP** and the alternate method must be **DOCUMENTED** with an adequate hazard assessment tool such as a JSA. The document must be **APPROVED** by a supervisor before such procedures are implemented.

8.0 REFERENCES

- Alberta Occupational Health and Safety Act, Regulation and Code – {Part 18, Section 240-241 Personal Protective Equipment}
- Alberta Occupational Health and Safety Act, Regulation and Code – {Part 12, Section 195 Working on Ice}
- 950C-C-039 Mobile Equipment Code
- 950C-C-046 Powered Equipment Code
- 962C-SOP-032 Recovery of Stuck or Immobile Equipment

9.0 APPENDICES

No appendices.