STANDARD OPERATING PROCEDURE

Digging and Design of Trenches and Excavations		Document Number: 962C-SOP-022
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DIGGING AND DESIGN OF TRENCHES AND EXCAVATIONS

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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 digging and designing trenches and excavations.

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

- Unstable ground conditions leading to personal injury or equipment damage.
    - Trenches and excavations will be designed per 950C-C-014 Excavations and Trenching Code and in compliance with area legislation.
    - Soils will be stabilized using shoring, sloping, or cutbacks based on soil classification.
    - Cutbacks will be designed according to soil type classification when workers are in trenches greater than 1.2 m.
    - Soil classification will follow 950C-C-014 Excavations and Trenching Code and jurisdictional authority.
    - Temporary protective structures and shoring will be designed per 950C-C-014 Excavations and Trenching Code. Structures greater than 3 m require design, construction and installation in accordance with the specifications of a professional engineer.
    - Spoil piles will be placed with the leading edge at least 1 m from the excavation/trench edge, sloped no greater than 45 degrees, and trimmed of loose materials i.e. rock, lumps.
    - Loose materials will be scaled and trimmed from trench/excavation sides if workers are nearby.
    - Safe entry/exit points will be established. Trenches greater than 1.2 m deep will have access within 8 m of workers.
    - Precautions will be taken near power poles to maintain original support. Identify methods to ensure power pool stability with supervision prior to task, document on a hazard assessment.
    - Water accumulation will be controlled using dewatering systems or other methods to prevent hazards.
- Inadequate guards or barricades causing personal injury or equipment damage.
    - Open trenches/excavations will be clearly marked with flagging, barricades, signage, or other safeguards.
    - Safe access for powered mobile equipment will include barriers high enough to prevent roll-ins.

- Unidentified underground utilities lead to personal injury or equipment damage.
    - Ensure current as-built drawings are available and reviewed with crew prior to work.
    - Secure ground disturbance permits as required prior to earth work commencing.
    - Clearly mark all known buried facilities before trenching/excavation.
    - No mechanical excavation within the hand exposure zone until the facility is exposed to sight.
    - Spotters will be used when working near buried facilities.
    - If a buried facility is struck, stop work and notify supervisor immediately.
    - If equipment contacts a live electrical facility, the operator will remain in the cab until it has been de-energized and safe to exit
- Working in a restricted or confined space causing personal injury.
    - Trenches may be considered a restricted space due to limited access/egress.
    - Excavations and trenches may be confined spaces if additional hazards (e.g. limited access/egress, hazardous atmosphere, etc.) are present.
    - Follow 950C-C-029 Hazardous Space Entry Code and 962C-SOP-024 Working in Trenches or Open Excavations.
    - Conduct initial or continuous atmosphere testing as required.
    - Obtain confined space permits before entry if applicable.
- Hazardous atmosphere causing personal injury and equipment damage.
    - Conduct atmosphere testing to assess air quality and explosive conditions.
- Working in congested areas causes personal injury or equipment damage.
    - Follow 962C-SOP-023 Excavators Working in Congested Areas.
    - Operators will perform an equipment walk around at the start of shift, after breaks, following repositioning and anytime operator is unsure of proximity of people, equipment or obstacles.
    - Operators will swing to “good side” whenever possible to enhance visibility.
    - Operators will flag swing radius when operating in close proximity to people, other equipment or in high traffic areas.
    - Operators will ground equipment implements when not in operation.

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.
- ☐ **Standard of Training required for working on this job: On-the job training.**

5.0 DEFINITIONS

5.1 Company

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

5.2 Company Personnel

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

5.3 Excavation

Dug out area of ground; does not include tunnel, underground shaft or open pit mine.

5.4 HSE

Refers to the Health, Safety & Environment department.

5.5 Hand Exposure Zone

All pipelines and fiber optics within a 5m radius of the Ground Disturbance area or within the public Right of Way must be hand exposed to verify size, depth and alignment. For all other buried facilities, the hand exposed zone is 1 m. Hand exposure includes excavation by water or air jets.

5.6 Trench

Long narrow dug out area of ground that is deeper than its width at the bottom.

6.0 PROCEDURE

1) Review as-built drawings and ensure all known buried facilities have been located and identified.
2) Determine scope of work and develop JSA prior to excavating.
3) Determine if the work area will be deemed a restricted space, confined space or neither.
4) Obtain permits as required (ground disturbance, confined space, etc.).
5) Identify soil type classification. Disturbed soil will be stabilized as per 950C-C-014 Excavations and Trenching Code (sloping, shoring, cutbacks, temporary protective structures, etc.).
6) Operators will review JSA and complete a FLRA prior to commencing excavating activities.
7) Operators will conduct a pre-operation inspection of equipment prior to commencement of work.
8) Operators will conduct a walk around inspection of equipment at the beginning of shift, after breaks, when repositioning equipment and anytime equipment operator is unsure of proximity to people, other equipment or obstacles.
9) Flag swing radius of equipment when working in close proximity to people, other equipment or high traffic areas. Use spotters in areas of limited visibility. Swing to the good side where possible.
10) Mark trenches and open excavations with signage, barricades, and flagging.
11) Establish safe entry and exit points for personnel and equipment.

12) Place spoil piles a minimum of 1 metre from the trench or excavation. Piles will not exceed a 45 degree angle from the horizontal.

13) Conduct atmosphere testing and monitoring as required.

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 32, Excavating and Tunnelling
- 950C-C-014 Excavations and Trenches Code
- 950C-C-024 Ground Disturbance Code
- 950C-C-029 Hazardous Space Entry Code
- 962C-SOP-023 Excavators Working in Congested Areas
- 962C-SOP-024 Working in Trenches or Open Excavations

9.0 APPENDICES

- No appendices.