

STANDARD OPERATING PROCEDURE

Fuel Tank Repairs by Welding

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Revision Number: 3

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FUEL TANK REPAIRS BY WELDING



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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 fuel tank repairs by welding.

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

- Tank rolling over and striking a person or damaging tools or equipment.
 - Block the tank; set up the work table or area so the tank is stable. Ensure tank is secured at all times.
- Tank blowing apart or flames shooting from openings due to vapour ignition/explosion.
 - Steam or hot water flush; inert with CO₂, or Argon; use a gas monitor to determine the level of flammable/combustible gases within the tank.
- Residual fuel left inside the tank after steaming or pressure washing procedure causing potential ignition or explosion during welding repairs.
 - Ensure all caps, plugs, gauges, etc. are removed prior to any hot work.
 - Air quality test each section/opening of the tank prior to hot work. Do not conduct hot work when LEL is above 10%.
- Hot work by welders.
 - Ensure that before using gas welding or burning equipment, that the equipment is free from defects, leaks, oil and grease. Conduct an equipment inspection.
 - Refer to 950C-C-031 Hot Work Code and 960C-SOP-307 Hot Work by Welders to assist in identifying the proper level of protection against a potential injury while operating in a hot work environment.

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- Flammable/combustible materials, liquids, aerosol cans burning due to heat exposure.
 - Clear work area of all flammable/combustible materials and liquids, and aerosol cans.
- Tank blowing apart from air pressurization.
 - When pressurizing to locate holes, use a low air pressure of about 3 PSI.
- Faulty gas monitor.
 - The monitor must be in good working order and properly maintained and calibrated monthly. The alarm must be set at the right level.
 - Only trained workers may use the gas monitor.
- Confined Space work.
 - Absolutely no employee may enter a confined space for any reason unless properly trained in Confined Space Entry.
 - All workers tasked with any such confined space work must adhere to 950C-C-029 Hazardous Space Entry Code at all times. Confined space procedures shall be followed for workers entering tanks, bins or vessels to perform hot work.
 - Ensure hazardous space work entry form is completed and signed prior to any work commencing.

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 HSE

Refers to the Health, Safety & Environment department.

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6.0 PROCEDURE

- 1) Pump off the fuel in the tank.
- 2) Remove the tank from equipment.
- 3) Remove fast fill components from top of tank.
- 4) Place the tank on blocks at the wash bay or pad.
- 5) Flush the tank with hot water for a minimum of 12 hours. Control the discharge of the contaminated water so that the discharge overflows out of the highest point on tank.
- 6) Remove the bottom plugs and drain the water/sludge.
- 7) Allow the tank to cool down.
- 8) Use a gas monitor to evaluate the lower explosive level (LEL). **If it is more than 10%, return to steaming or pressure washing (temperature must be at least 150°F, 65.5°C),** or other means of cleaning out the residue (i.e. introduce detergent to the steam/ hot water). Retest the LEL. Once it is 10% or less, move on.
- 9) Insert the probe tube at the fill spout and tape in place. Pack a cloth rag in the spout to block the outflow of inerting gas. ****Continuous air quality monitoring will take place throughout the duration of the welding repair. Hot work must stop if the LEL exceed 10%.**
- 10) Pressurize the tank to about 3 PSI and locate the leaks. Use a soap solution to help indicate where the leaks are. Mark the leaks and remove the air pressure.
- 11) Assess the size of the holes to determine whether to gouge or grind, then do so.
- 12) When gouging, periodically stop and physically check to see if the gouge has broken through at any point. ****Precaution: high pressure air that enters the tank may enhance the oxygen level and allow auto-ignition.**
- 13) When grinding, be aware that sparks may enter the tank and ignite the vapours.
- 14) Fill the trough with wire feed or stick weld.
- 15) Pressurize the tank to about 3 PSI; apply the soap solution to the welded area to ensure it is sealed.
- 16) Once the leaks are sealed, reinstall the tank.

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

- 950C-C-031 Hot Work Code
- 950C-C-028 Hazardous Energy Isolation Code
- 950C-C-029 Hazardous Space Entry Code
- 960C-SOP-307 Hot Work by Welders
- 960C-SOP-308 Air Arcing, Gouging Metal
- 960C-SOP-502 Safe use of Grinders

9.0 APPENDICES

No appendices.