

STANDARD OPERATING PROCEDURE

Operating TowHaul Trucks - Towing Electric Haul Trucks

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OPERATING TOWHAUL TRUCKS – TOWING ELECTRIC HAUL TRUCKS



G. Schreyer

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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 operating a TowHaul for the recovery of an electric haul truck.

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

- Unfamiliar with driving in a mine environment.
 - Follow site specific mine driving rules. Obtain permits as required.
 - Review 962C-SOP-016 Operating Haul Trucks General
 - Use an escort where required, as per site specific mine driving rules.
 - Use a pilot vehicle.
 - Plan and drive route before towing a disabled truck.
 - Do not tow trucks on grades greater than 8%
 - Do not tow with operator in cab of disabled truck.
 - Do not tow disabled truck with box raised or material in box.
 - Assess area for overhead hazards and power lines; plan the tow away from power lines and trailing cables.
- TowHaul unit jackknifing due to turning too sharp and operating on uneven roads.
 - Always ensure there is adequate room to turn the unit; be aware of the unit's turning radius. Wait for traffic to clear the intersections.
 - When turning the TowHaul unit on a tight radius, take care that the leading edge of the disabled unit does not interfere with the TowHaul truck.
 - Drive to road conditions and slow down when travelling on uneven roads. Maximum speeds shall not exceed:
 - 35 km/hr (22 mph) when empty
 - 8 km/hr (5 mph) at the top of first gear when towing

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- Improper communication; interaction with other equipment and personnel.
 - Follow site specific mine driving rules.
 - Use a pilot vehicle to control traffic where necessary.
 - Notify area supervisor of tow.
 - Establish hand signals and/or radio communication with ground personnel.
 - Establish radio communication with pilot vehicles.
 - Determine requirement to use client radio in addition to Company radio; use client radio if applicable.
 - Use pylons and/or barricades to identify work area when connecting and disconnecting TowHaul and disabled truck. Do not permit unnecessary personnel in work area. Additional signage designating single lane traffic may also be required if working on an active haul road.
- TowHaul truck contacting disabling truck causing equipment damage.
 - Use cameras and spotters for spotting equipment. On their own, cameras are not adequate because they cannot estimate depth accurately therefore spotters are required as well.
 - If more than one spotter is used, designate primary spotter. Two spotters are recommended, one to guide left to right alignment of trunnion pin and tow hook; one to relay signals to TowHaul truck operator.
 - Review spotter signals with all personnel prior to the task.
- Uncontrolled movement of equipment or energy sources while inspecting disabled truck, hooking up hoses and lines, securing disabled truck to TowHaul, or dumping material from disabled truck.
 - Ensure hazardous energy is isolated (lockouts and wheel chocks) on TowHaul and disabled truck while park brake hoses, service brake hoses and hydraulic lines are being hooked up to disabled truck.
 - Ensure disabled truck is locked out when inspecting.
 - TowHaul truck transmission is locked out when dumping load on disabled truck. No one in cab of disabled truck while material is being dumped using the auxiliary dump procedure.
 - Drain a small amount of hydraulic oil from the disabled unit to avoid contamination of the TowHaul lines and oil system if the TowHaul is being used to dump material from the disabled truck.
 - Ensure front service brakes on disabled truck have been engaged via service brake tooling before using TowHaul to release park brakes on disabled truck.
 - Ensure service brake accumulator pressure has been released/bled down.
 - Do not park equipment or vehicles behind disabled truck. Do not work behind disabled truck if hazardous energy (haul truck movement) has not been controlled.
- Pinch point between trunnion pin cup and disabled truck.
 - Grease pin when required to prevent it from becoming stuck.
 - Do not place body parts in the line of fire.
 - Before raising a disabled truck, ensure personnel are far enough away from the TowHaul unit as the disabled truck may jerk in any direction when lifted.

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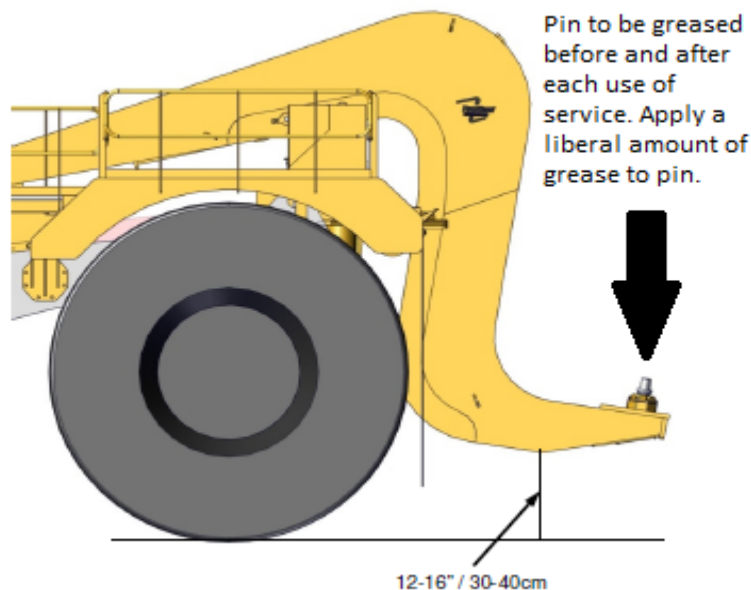
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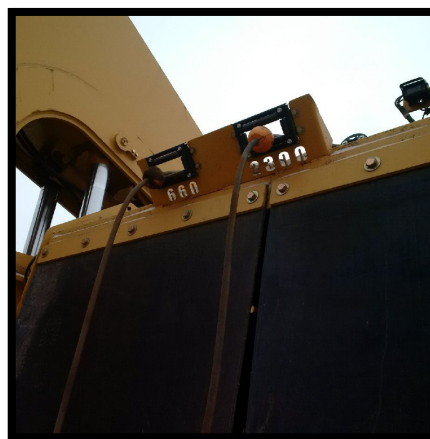
- Debris on trunnion pin and in receiver bracket causing inadequate attachment of disabled unit. Damaged receiver bracket.
 - Inspect and clean pin and receiver bracket regularly.
 - Prior to the unit's first tow, ensure the receiver bracket is non-destructively inspected (NDT). NDT inspection shall be completed annually thereafter and may occur more frequently if visual inspection observes wear or cracks in the receiver.
- Trunnion pin popping out releasing towed disabled unit.
 - Ensure the TowHaul is in the proper position and the goose neck is all the way up with the manual lock in place.
 - Ensure the proper washer is on the trunnion pin with the flat side up.
 - Inspect trunnion pin receiver/tow hook for damage after connection. Do not tow disabled unit if hook is cracked.
- Brake malfunction on TowHaul unit.
 - Use front service brake tooling to engage front service brakes prior to connecting TowHaul to disabled truck's park brake system.
 - Ensure the TowHaul system is set up as per procedure to ensure brakes on disabled unit work in conjunction with the TowHaul truck and activate upon release.
 - **DO NOT** operate TowHaul unit until brake system is fully operational.

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- Oil injection from hydraulic hoses when disconnecting disabled unit.
 - Release pressure from TowHaul to disabled truck before disconnecting hydraulic hoses.
- Incorrect brake release hoses between TowHaul truck and disabled truck.
 - Brake release hoses are manufacturer specific; ensure the hoses match the type of equipment being towed:
 - 660psi circuit - Caterpillar
 - 2300psi circuit – Komatsu and Hitachi EH5000



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 Disabled Truck

Disabled equipment that is being towed with the TowHaul truck.

5.2 TowHaul Truck

Tow truck with trunnion pin.

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5.3 TowHaul Unit

TowHaul truck and disabled truck.

5.4 Company

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

5.5 Company Personnel

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

5.6 HSE

Refers to the Health, Safety & Environment department.

6.0 PROCEDURE

6.1 General

- Operate the TowHaul unit in compliance with site specific mine driving rules.
- Maintenance personnel completing hookups must refer to OEM manuals for disabled vehicles.
- Area supervisor must be notified prior to working on a disabled vehicle. Area will be identified with pylons or barricades. Additional signage designating single lane traffic may also be required if working on an active haul road.
- Routes, horn signals and radio channels must be understood. Routes must be planned and driven ahead of task.
- Ensure routes and ramps are graded as needed and during winter conditions.

6.2 TowHaul Truck Operating Procedure

- 1) Operate truck brake systems prior to operating and moving the unit. These systems include but are not limited to individual activation of the service brake, park brake, secondary brake, and retarder brake from the operators cab. Activate each brake system individually with the engine running and the air system fully charged. If any application or release of any brake system does not appear to operate properly or if sluggishness is apparent on application or release, shut the unit down and notify maintenance personnel.
- 2) Raise the main boom cylinders to lift tow hook approximately 12-16" / 30-40 cm above ground level.
- 3) Release truck brakes and transport at slow speed. Maximum speeds shall not exceed:
 - 35 km/hr (22 mph) when empty
 - 8 km/hr (5 mph) at the top of first gear when towing

6.3 TowHaul Truck Parking Procedure

- 1) Stop TowHaul truck on flat level ground.
- 2) Set parking brakes on TowHaul truck.
- 3) Lower main boom cylinders to rest tow hook on the ground.

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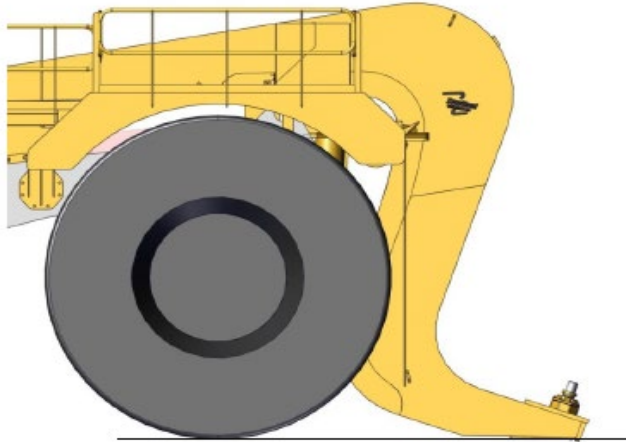
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6.4 Connecting Disabled Unit to TowHaul

- 1) Lockout (including wheel chocks) and inspect disabled truck in preparation for towing. Ensure disabled truck is empty and box is lowered prior to being towed. If material is in truck box refer to Section 6.7 TowHaul Unit Auxiliary Functions – Auxiliary Dump Procedure. NOTE: do not use procedure if material is frozen in box, contact operations for removal.
- 2) Ensure there is no material in front of the disabled truck so that the trunnion pin can go under the bumper.
- 3) Lockout (including wheel chocks) and inspect the trunnion pin on TowHaul for any damage. Ensure it is clean and the proper washer is on the pin (flat side up).
- 4) Inspect the hydraulic system, including but not limited to valves, hoses and cylinders, for leaks. Ensure dirt has not entered the system.
- 5) Inspect the tow hook for cracks or any irregular wear.
- 6) Inspect receiver brackets for debris and apply antiseize/grease on the trunnion pin at all times to ensure proper engagement and removal of the trunnion pin from the receiver on the disabled vehicle.
- 7) Ensure all brakes except the park brake have been released from the disabled truck and the gear select is in neutral. Any hydraulic applied brakes must not be applied due to residual accumulator pressure.
- 8) On electric trucks, ensure electrical power is not generated through wheel groups and that dynamic braking does not occur on the disabled truck while being towed.
- 9) Release service brake accumulator pressure and bleed down accumulators. Fully close valves once pressure has been released from accumulators.

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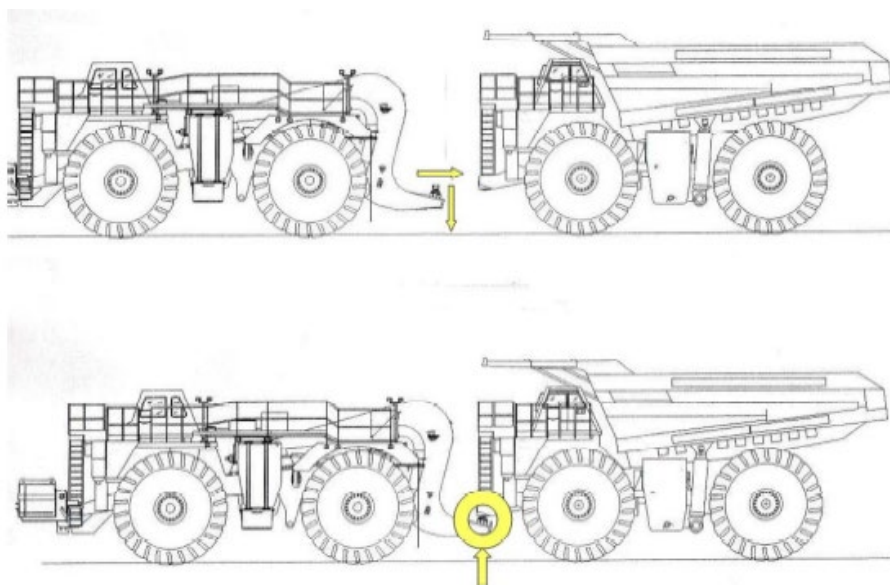
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- 10) Remove lockout and wheel chocks from TowHaul. Lower tow hook to tow bracket level.
- 11) Reverse TowHaul until the trunnion pin aligns with the opening in the tow bracket. Ensure spotters are used. One spotter will guide alignment of the trunnion pin to tow hook, a second spotter will communicate with TowHaul operator.
- 12) Raise the main boom cylinders until the trunnion pin is fully seated in the receiver.



- 13) Put TowHaul truck in neutral and set park brake. Lockout TowHaul truck transmission and ensure no one is in cab of TowHaul. Use wheel chocks.
- 14) Inspect tow hook for damage; do not attempt to tow disabled truck if tow hook is cracked from connecting the two units.
- 15) Install Front Wheel Service Brake Tooling to the front service brakes of disabled truck to apply service brakes.
 - a) Disconnect service brake lines on disabled truck at each front wheel.
 - b) Install a whip line from the service brake tooling to each front wheel.
 - c) Ensure service brake lines from the disabled unit are plugged using #8 JIC plugs.
 - d) Connect Komatsu brake release supply line from TowHaul to service brake tooling.
 - e) Open valves and pressurize brakes (Komatsu – 2500+/-100psi).
 - f) Once the application pressure has stabilized, close valves on tooling and release pressure that is in the supply line from the TowHaul.
 - g) Disconnect brake release supply line from front wheel service brake tooling.
 - h) Install Do Not Operate tag on front bumper stating, “front service brake lines are disconnected, front service brakes are pressured up with installed tooling”.

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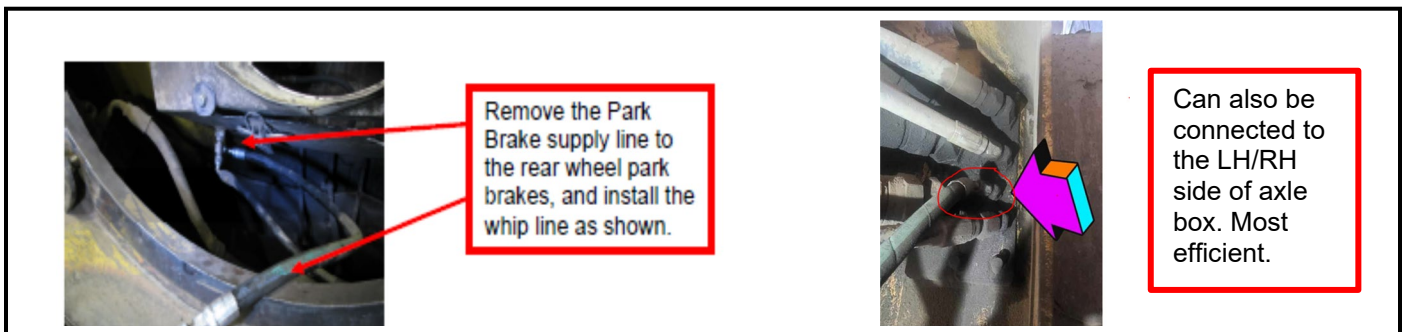
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Front Wheel Service Brake Tooling

16) Assemble park brake release supply line on TowHaul to disabled truck's park brakes by connecting Komatsu park brake release supply line from TowHaul to the rear park brake release whip line. Komatsu park brake release pressure is 2500+/-100psi.

- Route park brake release supply line from TowHaul to the rear axle of the disabled truck.
- Remove the park brake release supply line from the "T" fitting. Use the appropriate fitting (#6 JIC) at the "T".
- Install the park brake release whip line
- Ensure line will be secure from dragging and will not come into contact with any moving parts.
- Connect supply line from the TowHaul to the whip line.
- Dump nitrogen from rear struts.



Park Brake Release Supply Line & Whip Line

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Dump the nitrogen from both rear struts until oil just starts to appear from the drain line then shut the tap off. Should be the last step before the unit is towed.

Dump Nitrogen from Rear Struts

- 17) Reposition wheel chocks on disabled truck so that they are approximately 4 inches (10 cm) away from tires.
- 18) Remove wheel chocks on TowHaul and release transmission locks. Raise tow boom slightly, taking weight off disabled truck's front tires. Ensure personnel are clear from area and not in pinch point between trucks or behind disabled truck.

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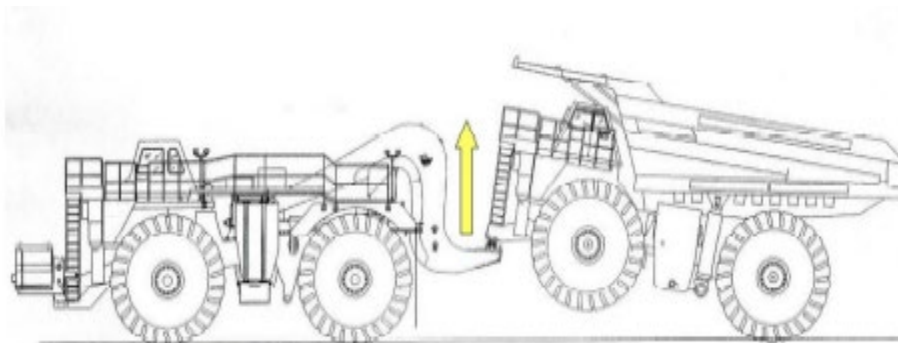
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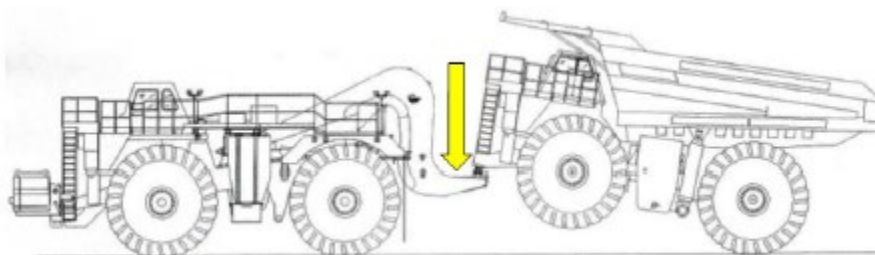
- 19) Using the TowHaul control panel release the park brakes on the disabled truck (select the park brake release option in the main screen of the Plus One system and use the up arrow to release the park brakes on the disabled truck). Allow pressure to stabilize before giving controls back to ground personnel.
- 20) Ground personnel will ensure there are no leaks occurring when park brakes are released. Ground personnel will inspect front bumper area to ensure there is no damage, slippage or cracking and that the front end is structurally sound. Remove wheel chocks from disabled truck.
- 21) TowHaul operator will raise tow hook until the main boom cylinders are fully extended.



- 22) Lock the mechanical lock.
- 23) TowHaul operator will lower the main boom cylinders so the mechanical lock rests on the pedestal.

6.5 Disconnecting Disabled Unit from TowHaul

- 1) Stop on a flat and level surface.
- 2) Set the park brake on the TowHaul truck only.
- 3) Fully raise main boom then unlock the mechanical lock.
- 4) Lower the disabled truck by lowering the main boom cylinders until the front tires just touch the ground. Ensure the tow pin stays fully engaged in the receiver.

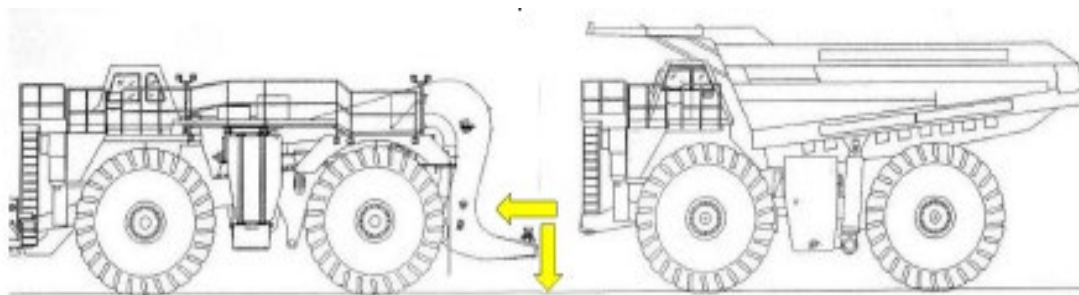


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- 5) Place wheel chocks in front and behind the rear tires, leaving approximately 4 inches (10 cm) between the tire and the wheel chock to allow the truck to move while it is being lowered.
- 6) Lower the main boom cylinders until most of the weight is off of the tow hook.
- 7) Using the TowHaul control panel set the park brake on the disabled vehicle (use the down arrow to apply the park brakes on the disabled truck). Confirm the park brakes are fully engaged. Properly chock wheels.
- 8) Finish lowering the tow hook to disengage the trunnion pin from the receiver on the disabled vehicle.
- 9) Once the tow pin is clear of the disabled unit's receiver apply the TowHaul park brakes and install wheel chocks. Apply transmission lock to TowHaul.
- 10) Isolate hazardous energy (lockout) disabled truck. Release pressure from front service brakes by bleeding off to zero.
- 11) Disconnect park brake release system. Remove park brake whip lines and install all park brake lines to their original locations.
- 12) Remove transmission lock and wheel chocks from TowHaul and ensure the trunnion pin is fully disengaged and clear of the bumper. Drive the TowHaul truck forward until it is clear of the disabled unit.



- 13) Remove "Do Not Operate" tags from disabled unit and prepare truck for repairs by applying personal locks and/or crossover locks.

6.6 Parking Operations for TowHaul Connected to Disabled Truck (TowHaul Unit)

- 1) Park on a level surface.
- 2) Engage the truck parking brake.
- 3) Shift the transmission control lever into NEUTRAL.
- 4) Fully raise main boom then unlock the mechanical lock.
- 5) Lower the disabled vehicle to the ground and disengage the park brake release.
- 6) Stop engine.
- 7) Turn the start switch and/or key to the off position.
- 8) Disengage the isolation switch.

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6.7 TowHaul Unit Auxiliary Functions – Auxiliary Dump Procedure

- 1) Do not dump if load is frozen, contact operations.
- 2) Shut down TowHaul truck while connecting lines to avoid residual pressure.
- 3) Lockout TowHaul truck transmission while connecting lines and when load is being dumped.
- 4) Connect the auxiliary dump lines to the disabled truck.
- 5) Bypass hoist control valve so the TowHaul has full hoist control.
- 6) Select the auxiliary dump option in the main screen of the Plus One system.
- 7) Use the up and down arrows to raise/lower the bed of the disabled truck.

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

- 962C-SOP-008 Signaling equipment
- 962C-SOP-016 Operating Haul Trucks – General
- 962C-SOP-032 Recovery of Stuck or Immobilized Equipment
- 950C-C-028 Hazardous Energy Isolation Code
- 960C-SOP-111 Live Work Working on Equipment While it is Running
- TowHaul Operation Manual – TH-360 TowHook
- Syncrude P28284-04 Recover Disabled Haul Truck with CAT 793B Tow Truck
- Suncor MEP4076A Towing of a Disabled Komatsu 930E Haul Truck with 797 Tow Truck
- Suncor MEP04134 Tow Recovery of Disabled 980E Haul Truck with the 797 Tow Truck

9.0 APPENDICES

- Appendix A – General Diagram of TowHaul Truck Assemblies

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Appendix A General Diagram of Assemblies

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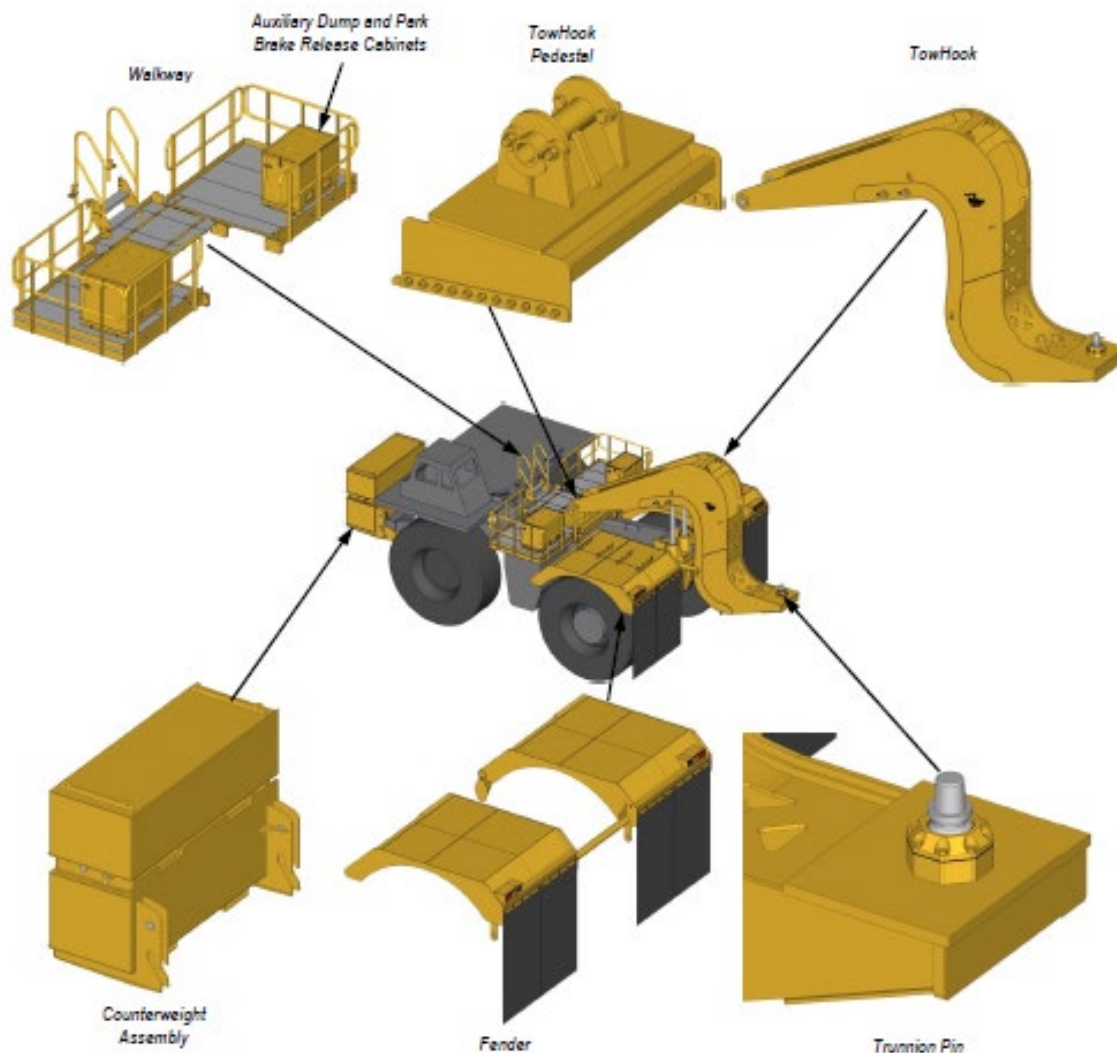
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