

Job Safety Analysis:		Job/Task: Tank Repair		Date: June 4, 2004	
New <input checked="" type="checkbox"/> Revised					
Dept/Line: Production		Page <u> 1 </u> of <u> 15 </u>		Analysis by:	
Trainer Signature:				Reviewed by:	
Employee Signature:				Approved by:	
Required and/or recommended personal protective equipment (PPE): slip-resistant soles and steel toes, safety glasses, leather gloves, abrasive blasting supplied air respirator with appropriate helmet and hood, full-face respirator with HEPA cartridges, hearing protection, knee-pads					
Step #	Sequence of basic job steps	Potential safety hazards	Potential ergonomics hazards	Recommended action/procedure	
<i>Note</i>	<i>Prior to initiating an inspection for tank repair or an actual tank repair, employees should review the latest procedures as outlined in this JSA and its companion work instruction document. As this job is performed exclusively within a confined space and abrasive blasting is used, extreme care should be taken.</i>	<i>Confined space issues</i> <i>Lockout/tagout issues</i> <i>Slip, trip or fall potential</i> <i>Blasting media exposure</i> <i>Slips, trips and falls</i>	<i>Lifting</i> <i>Awkward postures</i> <i>Excessive reach</i> <i>Vibration</i> <i>Temperature (compressed air)</i>	<i>Follow procedures as outlined in JSA and review appropriate work instructions:</i> <i>Follow appropriate EHS policies and procedures on Hazcom, Lockout/tagout and Confined Space Entry</i> <i>Use NIOSH-approved abrasive blasting supplied air respirator (SAR) with appropriate helmet and hood that is in compliance with 29 CFR 1910.94 and only use such system in conjunction with other approved ventilation systems</i> <i>Strictly comply with elements of the OSHA Permit-Required Confined Space Standard, 29 CFR 1910.146 and elements of this standard that specify non-entry rescue of entry personnel!</i>	
	<i>References for appropriate abrasive blasting PPE can be found in 29 CFR 1910.94, "Ventilation"</i>				

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Step #	Sequence of basic job steps	Potential safety hazards	Potential ergonomics hazards	Recommended action/procedure	
1	Setup and Preparation for Tank Inspection and Repair: Tank repair personnel shall assess the necessity of repair based on referral from operations. Repair is based on the impingement of the glass lining of bulk product tanks (normally associated with oxidation of the steel substrate or a CIP jet having been dropped).	<p>Failure to adequately assess the situation and preplan actions</p> <p>Failure to PM tools and equipment necessary to perform the repairs</p> <p>Failure to PM the abrasive blasting supplied air respiratory system (SAR) and associated ventilation equipment</p> <p>Failure to review appropriate MSDS for blasting media and repair media</p> <p>Failure to obtain and complete the "Confined Space Entry Permit"</p> <p>Failure to ensure that all gas detection monitoring equipment is fully operational, within calibration and will perform the appropriate continuous area monitoring without failure from the blasting media</p>	<p>Failure to prepare and stage equipment necessary for performing climbing tasks</p> <p>Failure to ensure that all transport carts are in good working order</p>	<p>Be sure to adequately assess the situation and preplan actions</p> <p>Perform a PM on tools and equipment necessary to perform the repairs</p> <p>Perform a PM on the abrasive blasting supplied air respiratory system (SAR) and associated ventilation equipment, ensuring proper operation</p> <p>Review all appropriate MSDS for blasting media and repair media</p> <p>Obtain and complete the "Confined Space Entry Permit"</p> <p>Always ensure that all gas detection monitoring equipment is fully operational, within calibration and will perform the appropriate continuous area monitoring without failure from the blasting media</p>	

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2	Prepare for entry into the permit-required confined space by locking and tagging all appropriate valves. The tank should be ventilated. Perform initial area atmospheric monitoring to establish initial entry criteria. Once met, continuously monitor within the tank to ensure that atmospheric conditions do not change. Complete the entry permit by making the appropriate entries of gas detection levels and always ensure that an attendant is posted outside of the confined space.	Slip hazard when walking/standing on wet surface Potential to drop equipment on foot Confined space entry with both atmospheric and engulfment potential Lockout/tagout requirement in order to isolate atmospheric and engulfment potential Door is heavy, creating hand and arm crush potential Slip, trip and fall potential both getting into the confined space and moving about within	Awkward wrist/arm posture Awkward posture due to slippery/wet floor inside of the tank Potential for overhead and overshoulder reaches	Use good body mechanics and posture to avoid excessive reaches or awkward postures when working around/on tanks Use caution when walking/standing on any wet or uneven surface Comply with all confined space entry procedures, including atmospheric monitoring on a continuous basis Use lockout/tagout on all valves which could allow liquid or gas into the confined space Keep hands and arms free of the door area Continuously ventilate to remove CO2 and moisture Minimize awkward movements and any overhead/overshoulder arm actions	

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Step #	Sequence of basic job steps	Potential safety hazards	Potential ergonomics hazards	Recommended action/procedure	
3	Initial Entry and Inspection: Enter the tank to be inspected and repaired via the "manway" hatch. Use appropriate spot and area lighting not only to inspect the interior of the tank, but to ensure adequate lighting to perform all tasks safely.	Slip hazard when walking/standing on wet surface Potential to drop equipment on foot Confined space entry with both atmospheric and engulfment potential Lockout/tagout requirement in order to isolate atmospheric and engulfment potential Door is heavy, creating hand and arm crush potential Slip, trip and fall potential both getting into the confined space and moving about within	Awkward wrist/arm posture Awkward posture due to slippery/wet floor inside of the tank Potential for overhead and overshoulder reaches	Use good body mechanics and posture to avoid excessive reaches or awkward postures when working around/on tanks Use caution when walking/standing on any wet or uneven surface Comply with all confined space entry procedures, including atmospheric monitoring on a continuous basis Use lockout/tagout on all valves which could allow liquid or gas into the confined space Keep hands and arms free of the door area Continuously ventilate to remove CO2 and moisture Minimize awkward movements and any overhead/overshoulder arm actions	

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4	Inspect the tank interior with both the spotlight and flashlight. Shine the lights in sweeping motions to inspect all areas within. Estimate both the amount of repair necessary and the time required to perform the repair tasks. Assess the needs for specific equipment and the amount of repair media necessary to complete the repairs.	Slip hazard when walking/standing on wet surface Potential to drop equipment on foot Confined space entry with both atmospheric and engulfment potential Lockout/tagout requirement in order to isolate atmospheric and engulfment potential Door is heavy, creating hand and arm crush potential Slip, trip and fall potential both getting into the confined space and moving about within	Awkward wrist/arm posture Awkward posture due to slippery/wet floor inside of the tank Potential for overhead and overshoulder reaches	Use good body mechanics and posture to avoid excessive reaches or awkward postures when working around/on tanks Use caution when walking/standing on any wet or uneven surface Comply with all confined space entry procedures, including atmospheric monitoring on a continuous basis Use lockout/tagout on all valves which could allow liquid or gas into the confined space Keep hands and arms free of the door area Continuously ventilate to remove CO2 and moisture Minimize awkward movements and any overhead/overshoulder arm actions	

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5	Subsequent Entry and Repair Tasks Setup: After preplanning the repair tasks, have the attendant hand in all necessary equipment to prepare for the abrasive blasting tasks. These equipment and supplies include scaffolding, ladders, area and spot lighting, electrical extension cords, air lines tape, tool boxes, portable heaters, portable fans, etc Erect the scaffolding as far in the rear as possible and work forward.	Slip hazard when walking/standing on wet surface Potential to drop equipment on foot Confined space entry with both atmospheric and engulfment potential Lockout/tagout requirement in order to isolate atmospheric and engulfment potential Door is heavy, creating hand and arm crush potential Slip, trip and fall potential both getting into the confined space and moving about within	Awkward wrist/arm posture Awkward posture due to slippery/wet floor inside of the tank Potential for overhead and overshoulder reaches	Use good body mechanics and posture to avoid excessive reaches or awkward postures when working around/on tanks Use caution when walking/standing on any wet or uneven surface Comply with all confined space entry procedures, including atmospheric monitoring on a continuous basis Use lockout/tagout on all valves which could allow liquid or gas into the confined space Keep hands and arms free of the door area Continuously ventilate to remove CO2 and moisture Minimize awkward movements and any overhead/overshoulder arm actions	

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6	Working from the scaffolding, ladder or base of the tank, tape around the areas to be abrasive blasted. Ensure that enough area is left exposed to allow for creating the appropriate "profile" so that the repair media can bond. Continue to tape the areas to be repaired until all are prepared for blasting. Plug and/or tape off the vortices near the manway to prevent sand from going down the drain.	Slip hazard when walking/standing on wet surface Potential to drop equipment on foot Confined space entry with both atmospheric and engulfment potential Lockout/tagout requirement in order to isolate atmospheric and engulfment potential Door is heavy, creating hand and arm crush potential Slip, trip and fall potential both getting into the confined space and moving about within Significant potential for fall from the scaffolding or ladder if not erected properly and stable	Awkward wrist/arm posture Awkward posture due to slippery/wet floor inside of the tank Potential for overhead and overshoulder reaches Excessive forces may be required to gain mechanical advantage when reaching from the scaffolding or ladder Kneeling and bending associated with tasks on the base of the confined space	Use good body mechanics and posture to avoid excessive reaches or awkward postures when working around/on tanks Use caution when walking/standing on any wet or uneven surface Comply with all confined space entry procedures, including atmospheric monitoring on a continuous basis Use lockout/tagout on all valves which could allow liquid or gas into the confined space Ensure that scaffolding and ladder is erected properly and stable Continuously ventilate to remove CO2 and moisture Minimize awkward movements and any overhead/overshoulder arm actions	

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7	<p>Abrasive Blasting Operations:</p> <p><i>Note: Abrasive blasting operations performed in this job are covered by 29 CFR 1910.94. Appropriate PPE and ventilation must be used in order to perform this task safely.</i></p> <p>Attach air line to plant air supply. This hose should be attached to the distribution center regulator and air filter inlet. Fill 5 lb pots or 25 lb Lindsey blaster with #36 angular red garnet abrasive blasting medium.</p>	<p>Slip hazard when walking/standing on wet surface</p> <p>Potential to drop equipment on foot</p> <p>Confined space entry with both atmospheric and engulfment potential</p> <p>Lockout/tagout requirement in order to isolate atmospheric and engulfment potential</p> <p>Door is heavy, creating hand and arm crush potential</p> <p>Slip, trip and fall potential both getting into the confined space and moving about within</p> <p>Significant potential for fall from the scaffolding or ladder if not erected properly and stable</p>	<p>Awkward wrist/arm posture</p> <p>Awkward posture due to slippery/wet floor inside of the tank</p> <p>Potential for overhead and overshoulder reaches</p> <p>Excessive forces may be required to gain mechanical advantage when reaching from the scaffolding or ladder</p> <p>Kneeling and bending associated with tasks on the base of the confined space</p>	<p>Use good body mechanics and posture to avoid excessive reaches or awkward postures when working around/on tanks</p> <p>Use caution when walking/standing on any wet or uneven surface</p> <p>Comply with all confined space entry procedures, including atmospheric monitoring on a continuous basis</p> <p>Use lockout/tagout on all valves which could allow liquid or gas into the confined space</p> <p>Ensure that scaffolding and ladder is erected properly and stable</p> <p>Continuously ventilate to remove CO2 and moisture</p> <p>Minimize awkward movements and any overhead/overshoulder arm actions</p>	

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Step #	Sequence of basic job steps	Potential safety hazards	Potential ergonomics hazards	Recommended action/procedure	
8	Place blasting nozzle within 1 inch of the area to be abrasive blasted activate. Work the nozzle from the center of the fracture to the good glass, removing all flawed areas. Use circular motions when working from the center outwards. Follow any fracture lines to their ends. Lightly "feather" the edge of the area to no more than 1/4 inch of good glass or as required.	Slip hazard when walking/standing on wet surface Potential to drop equipment on foot Confined space entry with both atmospheric and engulfment potential Lockout/tagout requirement in order to isolate atmospheric and engulfment potential Door is heavy, creating hand and arm crush potential Slip, trip and fall potential both getting into the confined space and moving about within Significant potential for fall from the scaffolding or ladder if not erected properly and stable	Awkward wrist/arm posture Awkward posture due to slippery/wet floor inside of the tank Potential for overhead and overshoulder reaches Excessive forces may be required to gain mechanical advantage when reaching from the scaffolding or ladder Kneeling and bending associated with tasks on the base of the confined space Potential for extreme cold air contact from compressed air blaster	Use good body mechanics and posture to avoid excessive reaches or awkward postures when working around/on tanks Use caution when walking/standing on any wet or uneven surface Comply with all confined space entry procedures, including atmospheric monitoring on a continuous basis Use lockout/tagout on all valves which could allow liquid or gas into the confined space Ensure that scaffolding and ladder is erected properly and stable Continuously ventilate to remove CO2 and moisture Minimize awkward movements and any overhead/overshoulder arm actions	

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Step #	Sequence of basic job steps	Potential safety hazards	Potential ergonomics hazards	Recommended action/procedure	
8 (Con't)	Place blasting nozzle within 1 inch of the area to be abrasive blasted activate. Work the nozzle from the center of the fracture to the good glass, removing all flawed areas. Use circular motions when working from the center outwards. Follow any fracture lines to their ends. Lightly "feather" the edge of the area to no more than 1/4 inch of good glass or as required.	<p>Significant hazard exists from blasting operation due to elevated levels of respirable silica and blasting media constituents such as beryllium that have been detected during industrial hygiene monitoring</p> <p>Potential for area atmospheric monitor failure due to ingestion/clogging of gas detector with significant amounts of airborne blasting media particulates</p> <p>Potential for contact with skin/eyes of high velocity blasting media from high pressure blaster</p> <p>Attendant can be exposed to silica and particulates outside of the confined space</p>		<p>Avoid contact with compressed air on exposed skin or body extremities</p> <p>Always use a NIOSH -approved abrasive blasting supplied air respirator (SAR) with appropriate helmet and hood assembly when abrasive blasting inside of the tank</p> <p>The attendant should always use a full-face high-efficiency particulate cartridge respirator outside of the tank during abrasive blasting operations</p> <p>Ensure that continuous area monitoring for atmospheric hazards is uninterrupted by the particulates during abrasive blasting</p>	

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Step #	Sequence of basic job steps	Potential safety hazards	Potential ergonomics hazards	Recommended action/procedure	
9	Upon completion of abrasive blasting within the confined space, the entrant can switch to a full-face HEPA respirator (NIOSH-approved). All of the particulates and excess blasting medium should be swept and vacuumed up for disposal. All used abrasive blasting medium should be disposed of properly.	Slip hazard when walking/standing on wet surface Potential to drop equipment on foot Confined space entry with both atmospheric and engulfment potential Lockout/tagout requirement in order to isolate atmospheric and engulfment potential Door is heavy, creating hand and arm crush potential Slip, trip and fall potential both getting into the confined space and moving about within Significant potential for fall from the scaffolding or ladder if not erected properly and stable	Awkward wrist/arm posture Awkward posture due to slippery/wet floor inside of the tank Potential for overhead and overshoulder reaches Excessive forces may be required to gain mechanical advantage when reaching from the scaffolding or ladder Kneeling and bending associated with tasks on the base of the confined space Potential for extreme cold air contact from compressed air blaster	Use good body mechanics and posture to avoid excessive reaches or awkward postures when working around/on tanks Use caution when walking/standing on any wet or uneven surface Comply with all confined space entry procedures, including atmospheric monitoring on a continuous basis Use lockout/tagout on all valves which could allow liquid or gas into the confined space Ensure that scaffolding and ladder is erected properly and stable Continuously ventilate to remove CO2 and moisture Minimize awkward movements and any overhead/overshoulder arm actions	

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10	<p>Belzona Application:</p> <p><i>Note: Review MSDS for Belzona patching and filler media</i></p> <p>Ensure that all areas to be filled and patched with Belzona are dry, clean and rust-free. Remove tape and apply patching media as appropriate.</p>	<p>Slip hazard when walking/standing on wet surface</p> <p>Potential to drop equipment on foot</p> <p>Confined space entry with both atmospheric and engulfment potential</p> <p>Lockout/tagout requirement in order to isolate atmospheric and engulfment potential</p> <p>Door is heavy, creating hand and arm crush potential</p> <p>Slip, trip and fall potential both getting into the confined space and moving about within</p> <p>Significant potential for fall from the scaffolding or ladder if not erected properly and stable</p>	<p>Awkward wrist/arm posture</p> <p>Awkward posture due to slippery/wet floor inside of the tank</p> <p>Potential for overhead and overshoulder reaches</p> <p>Excessive forces may be required to gain mechanical advantage when reaching from the scaffolding or ladder</p> <p>Kneeling and bending associated with tasks on the base of the confined space</p>	<p>Use good body mechanics and posture to avoid excessive reaches or awkward postures when working around/on tanks</p> <p>Use caution when walking/standing on any wet or uneven surface</p> <p>Comply with all confined space entry procedures, including atmospheric monitoring on a continuous basis</p> <p>Use lockout/tagout on all valves which could allow liquid or gas into the confined space</p> <p>Ensure that scaffolding and ladder is erected properly and stable</p> <p>Continuously ventilate to remove CO2 and moisture</p> <p>Minimize awkward movements and any overhead/overshoulder arm actions</p>	

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Job Safety Analysis:		Job/Task: Tank Repair		Date: June 4, 2004	
New <input checked="" type="checkbox"/> Revised					
Dept/Line: Production		Page ___15___ of ___15___		Analysis by:	
Trainer Signature:				Reviewed by:	
Employee Signature:				Approved by:	
Required and/or recommended personal protective equipment (PPE): slip-resistant soles and steel toes, safety glasses, leather gloves, abrasive blasting supplied air respirator with appropriate helmet and hood, full-face respirator with HEPA cartridges, hearing protection, knee-pads					
Step #	Sequence of basic job steps	Potential safety hazards	Potential ergonomics hazards	Recommended action/procedure	
11	Upon completion of the patching, allow to dry. Remove all of the equipment from the tank. Sweep and rinse all remaining particulate matter out of the tank. Ensure that the vortex is unplugged and clear. Clean all equipment and return to storage or stage for next repair.	<p>Slip hazard when walking/standing on wet surface</p> <p>Potential to drop equipment on foot</p> <p>Confined space entry with both atmospheric and engulfment potential</p> <p>Lockout/tagout requirement in order to isolate atmospheric and engulfment potential</p> <p>Door is heavy, creating hand and arm crush potential</p> <p>Slip, trip and fall potential both getting into the confined space and moving about within</p> <p>Significant potential for injury from the scaffolding or ladder when disassembling/removing them</p>	<p>Awkward wrist/arm posture</p> <p>Awkward posture due to slippery/wet floor inside of the tank</p> <p>Potential for overhead and overshoulder reaches</p> <p>Excessive forces may be required to gain mechanical advantage when reaching from the scaffolding or ladder</p> <p>Kneeling and bending associated with tasks on the base of the confined space</p>	<p>Use good body mechanics and posture to avoid excessive reaches or awkward postures when working around/on tanks</p> <p>Use caution when walking/standing on any wet or uneven surface</p> <p>Comply with all confined space entry procedures, including atmospheric monitoring on a continuous basis</p> <p>Use lockout/tagout on all valves which could allow liquid or gas into the confined space</p> <p>Close out confined space entry permit and file appropriately</p> <p>Continuously ventilate to remove CO2 and moisture until repairs are complete</p> <p>Minimize awkward movements and any overhead/overshoulder arm actions</p>	

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