

 WESTLAKE CHEMICAL CORPORATION LAKE CHARLES SAFETY & HEALTH	DOCUMENT #: 4301-06-360A
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PURPOSE AND SCOPE

The purpose of this procedure is to provide a plant standard that supports the safe operation of high-pressure hydroblasting equipment capable of creating working pressures of **3,500 psi** or greater. This procedure applies to all Westlake employees and contractors.

Note: This procedure applies to all Hydroblasting equipment with working pressures of **3,500 psi** or greater. Water washing equipment with working pressures of less than **3,500 psi** shall utilize the **Pressure Washer Procedure**. (See EDM document #**4301-06-360**).

RESPONSIBILITY

It is the responsibility of all Westlake employees and contractors to follow these safety rules.

DEFINITIONS

- 1.1 Affected Area – The barricaded area around Hydroblasting activities
- 1.2 Anti-withdrawal Device – A mechanical device that attaches or clamps to the equipment which prevents the lance from backing out of the equipment being cleaned.
- 1.3 Anti-reversal Device – A rigid piece of pipe affixed to a line mole to prevent reversing of the mole inside the line, tube or pipe. Also called a “stinger”.
- 1.4 Flex Lance – Flexible tube that attaches to a hose on one end and to an Anti-reversal and/or nozzle on the other.
- 1.5 Double Hearing Protection - Dual hearing protection involves wearing two forms of hearing protection simultaneously (typically, both earplugs and ear muffs) required at sound level at 105 decibels.
- 1.6 Hydro blasting – High pressure water operations above 3500 pounds per square inch.
- 1.7 Job Safety Analysis – Job Safety Analysis, or equivalent, is a documented hazard assessment tool which evaluates the hazards of a job and identifies a way to eliminate or mitigate the hazard or hazards. Job Safety Analyses also document the Personal Protective Equipment required for the job.
- 1.8 Lance – a rigid tube to which a nozzle is attached and then inserted into and retracted from the interior of a pipe or tubular equipment.
- 1.9 Line Mole – a self-propelling device which carries the nozzle down the pipe or tube.
- 1.10 PSIG – the pressure on a system indicated by the gauge on the equipment which shows pounds per square inch.



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- 1.11 Rigid Lance – a tube at the end of a water hose used for hydroblasting.
- 1.12 Shotgun Lance – a rigid tube and a shoulder brace typically with a double dump mechanism.
- 1.13 Shotgunning – a hands on process whereby a hydroblasting technician uses the lance by holding it with both hands-on dual action mechanisms to allow the flow of water and pressure to flow through.

PROCEDURE

Set Up and Pre-Start-Up Requirements

- 2.1 Prior to starting a hydroblasting job, the contractor representative will inspect the equipment (after setup) and complete the Westlake Hydroblasting Pre-Job Checklist (See Appendix B). The checklist must be signed before any work can begin.
 - 2.1.1 Must be signed by Contract Representative and Westlake Representative.
- 2.2 The contractor shall complete a JSA prior to starting each job.
- 2.3 Contractor shall wear at a minimum the required PPE listed in Appendix A.
- 2.4 The completed Hydroblasting Pre-Job Check List will be maintained with the Safe Work Permit (SWP) while the job is in progress.
- 2.5 All equipment must be inspected prior to use.
- 2.6 All hoses, shotguns and equipment will be inspected at least quarterly by the contractor and marked to show quarter of inspection.
- 2.7 Any faulty equipment is to be removed from the site immediately.
- 2.8 If a leak is observed, the pump must be shut down and the leak repaired.

GENERAL HYDROBLASTING

Note: LEL monitoring must be performed on all equipment that has the potential to contain or contains flammable hydrocarbons and documented on the Safe Work Permit.

- 3.0 All areas are to be barricaded with red barricade tape with a large enough area to provide protection to employees.
- 3.1 Target and/or side shields will be put in place anywhere the potential exists for personnel to pass in the line of fire or within the splash zone. This is to



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safeguard personnel from exposure to water and flying debris.

- 3.2 Employees entering the barricaded area while hydroblasting is in progress must wear the required personal protective equipment.
- 3.3 Lances or shotguns are not to be left unattended or laid down while the pump is running. The pump attendant must be within 25 feet of the pump while it is running
- 3.4 Lances or shotguns are not to be moved from one location to another while the pump is running. Special attention must be given to systems that remain pressurized after the pump is shutdown.
- 3.5 All hoses should be protected from being driven over and crushed.
- 3.6 When hose drops exceed 10 feet, the hose is to be securely fastened to a rigid support to limit pull due to the hose weight.
- 3.7 All of the hose connections will have whip checks installed.
- 3.8 Automated hydroblasting equipment is considered an energy source. Before personnel may enter a confined space where automated hydroblasting equipment is being used, the hydroblasting equipment must be locked out.
- 3.9 Ground cables attached to a qualified grounding source and wheel chocks in place prior to beginning hydro-blast job and maintained through-out the duration.
- 3.10 Hydro-blasting on scaffolding or elevated areas, shall follow all Walking Working Surface Guidelines along with Scaffolding and Fall Protection.
- 3.11 While working in Confined Spaces, there shall be only one hydro-blast technician in the space at a time and follow Confined Space Procedure guidelines.

TYPES OF HYDROBLASTING

4.1 Stiff Lance

- 4.1.1 An anti-withdrawal device must be used on all stiff lance jobs.
- 4.1.2 The anti-withdrawal device shall be secured to the equipment being cleaned.
- 4.1.3 A safety dump valve must be used and operated by the technician operating the nozzle.



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- 4.1.4 Lances must be marked 4 feet from the end of the nozzle.
- 4.1.5 While moving from one tube to the next, high pressure water must be bypassed by releasing the safety valve.
- 4.1.6 A hand guard must be used, when holding a stiff lance.
- 4.1.7 A lance rod holder will be used to attach the lance to the high-pressure hose.
- 4.1.8 The holder must have an approved steel double braided hose shroud properly installed.
- 4.1.9 A quick connect coupling will not be used to join the high-pressure hose and the lance rod.
- 4.1.10 The correct size and type of lance stop must be used when stiff lancing.

4.2 Flex Lance

- 4.2.1 Flex lancing by hand is prohibited.
- 4.2.2 An anti-withdrawal device must be used on all flex lance jobs.
- 4.2.3 The anti-withdrawal device shall be secured to the equipment being cleaned.
- 4.2.4 The technician operating the nozzle will have direct control of the safety dump system.
- 4.2.5 To eliminate accidental pressuring of the lance when moving from tube to tube, the technician must fully release the safety dump valve by removing their foot / hand.
- 4.2.6 Never hold the nozzle in your hand.
- 4.2.7 If the length of the nozzle and collar are not 1-1/2 times the diameter of the pipe / tube, an anti-reversal device (i.e. stinger) must be used.

4.3 Shotgun

- 4.3.1 The technician operating the nozzle must have direct control of the safety dump system.



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- 4.3.2 All shotguns will have a contact type control switch which when released, will cause water pressure at the nozzle to drop.
- 4.3.3 The point where the hose connects to the gun will be shrouded by an approved protective device to prevent injury to the technician should the hose rupture or separate at the gun/hose connection.
- 4.3.4 The six feet of high-pressure hose closest to the shotgun will be enclosed by an approved loose-fitting double-braided stainless shroud to protect the technician in the event the hose develops a leak.
- 4.3.5 Objects to be cleaned shall NOT be held manually.
- 4.3.6 The system will never be left unattended when pressurized.
- 4.3.7 When more than one shotgun operation is being performed within the same area, a physical barrier will be installed or adequate spacing between technicians will be maintained to prevent the possibility of injury from high pressure water or flying debris.
- 4.3.8 The minimum length of a shotgun lance extension is to be no less than 48" from the trigger to the nozzle.
- 4.3.9 90-degree nozzles are not to be used on hand-held guns.
- 4.3.10 Shotguns must have operational dual dump system.

4.4 Line Mole

- 4.4.1 An anti-withdrawal device must be used on all line mole jobs.
- 4.4.2 A foot operated dump valve must be used and operated by the technician operating the nozzle.
- 4.4.3 Lance must be marked 4 feet from the end of the nozzle.
- 4.4.4 While moving from one tube to the next, high pressure water must be bypassed by releasing the safety dump valve.



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- 4.4.5 Do not use quick connect fittings on the high-pressure hose on the discharge of the dump valve.
- 4.4.6 A deflector shield will be used with all line mole activities where the inside diameter of the pipe/tube being cleaned is 2 inches or greater.
- 4.4.7 An anti-reversal device (i.e. stinger) to prevent the mole from reversing direction in the pipe will be used.
- 4.4.8 The length of the anti-reversal device shall be 1-½ times the diameter of the pipe/tube being cleaned. If the pipe being cleaned has a "T", the length of the anti-reversal device shall be 3 times the diameter of the pipe.

RECORDS

- **Westlake Hydroblasting Pre-Job Check List shall be valid for one shift (12 hours). Checklist shall be turned into to control room along with Safe Work Permit at end of shift. Checklist to be retained for seven (7) days.**



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Appendix A
Hydroblasting Job/Task Specific PPE Matrix

Task / Job Title	Hazards	Minimum Required PPE
Cleaning - Low Pressure Water <150 psi (garden hose, utility water hose)	Splashes Skin Absorption	Hard Hat Safety Glasses w/ side shields Gloves FRC
Cleaning - Medium Pressure Water > 500 psi but < 3,500 psi (pressure washers in this range)	Splashes Skin Absorption Cuts	Hard Hat Face Shield/Goggles Safety Glasses w/ side shields Appropriate Chemical Gloves FRC Double Hearing Protection Req. Slicker Suit or Appropriate Chemical Suit
Cleaning - High Pressure Water > 3,500 psi (industrial machines)	Splashes Skin Absorption Severe Cuts Body Penetration	Hard Hat Face Shield/Goggles Safety Glasses w/ side shields Appropriate Chemical Gloves FRC Double Hearing Protection Req. Slicker Suit or Appropriate Chemical Suit



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Appendix B

Hydroblasting Pre-Job Check List

Date: _____

Contractor: _____

Maximum working pressure to be used for this job:

PSI

Type of Hydroblasting: (circle one) Stiff Lance Flex Lance Shotgun Automated (3D, etc.)

Item	Requirement	Yes	No	N/A
1	Has a Job Safety Analysis (JSA) been completed?			
2	Is minimum PPE noted on the Permit?			
3	Has the area been monitored for flammables? Properly barricaded?			
4	Is Deflector Shield installed (metal, plywood, etc.) to protect employees and equipment from water and flying debris? <i>(Not required for Shotgun)</i>			
5	Is the Pump Trailer and Truck properly chocked and grounded?			
6	Has all equipment been inspected and marked for the current quarter?			
7	Do all high-pressure hose connections have Whip Checks?			
8	Is an Anti-Withdrawal Device installed and secured to the equipment being cleaned? <i>(Not required on Shotgun)</i>			
9	Is the Safety Valve (Dump Valve) installed? <i>(Not required on 3D work)</i>			
10	Is the Dump Valve guarded?			
11	Is the Technician operating the nozzle controlling the Dump Valve?			
12	Is the Shotgun extension at least 48 inches long? <i>(from trigger forward)</i>			
13	Are safety shrouds installed? <i>(For Shotgun and Stiff Lance)</i>			
14	Is hose / lance visibly marked 4 foot from nozzle?			
15	<i>(For Line Mole Activities)</i> Is the length of the Anti-Reversal Device (i.e. Stinger) at least 1-½ times the diameter of the pipe/tube being cleaned?			
16	Verified there are no visible leaks on hoses or fittings.			

If answer to any question is "No", contact the Westlake Safety Department

Contractor Representative: _____ Date: _____

Westlake Representative: _____ Date: _____

Maintain This Completed Checklist with Safe Work Permit. Checklist must be turned in with Safe Work Permit at the end of work shift (12 hours). Retention period (7) days.