



# 2019 SPRING TECH CONFERENCE

Productivity & Safety in Water Jet Cleaning Operations



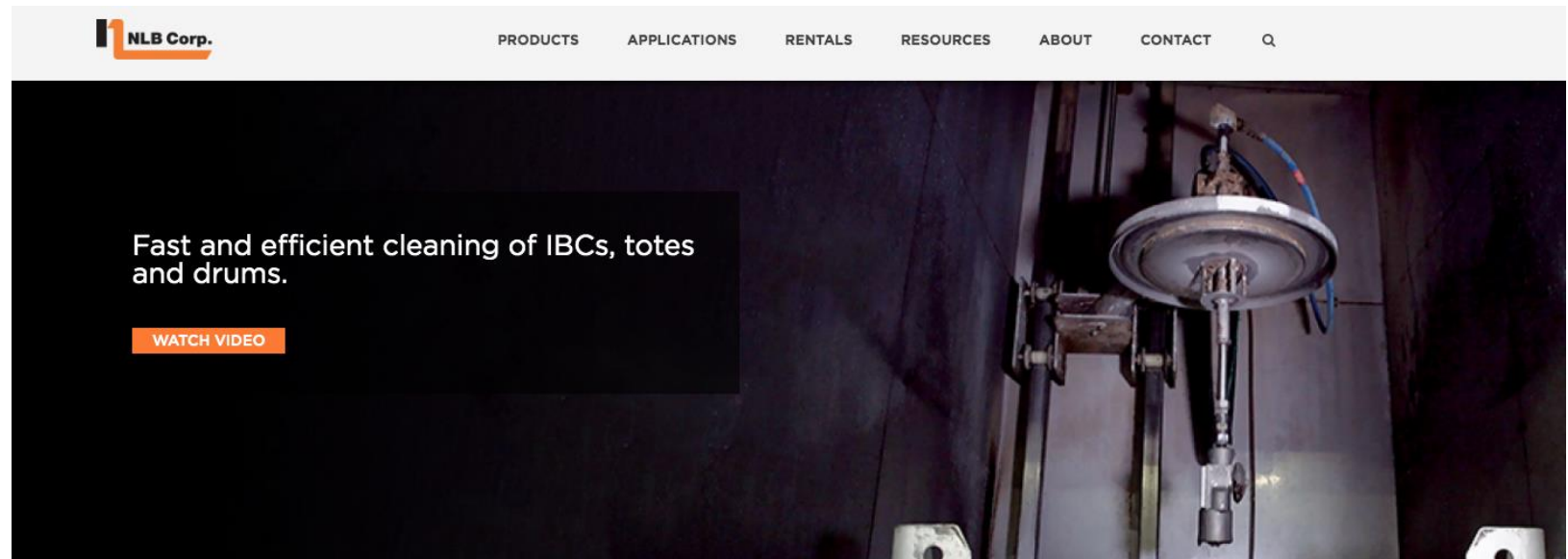
# PRODUCTIVITY & SAFETY

In Water Jet Cleaning Operations

# PRODUCTIVITY & SAFETY

## IN WATERJET CLEANING OPERATIONS

- UHP/HP Water Jet Cleaning Productivity
- UHP/HP Water Jetting Basics
- General Safety Issues
- Protective Gear (PPE)



<https://www.nlbcorp.com/applications/tank-tote-cleaning/>

# UHP/HP WaterJet Cleaning Productivity

- Welcome to the world of UHP/HP WaterJet Cleaning
- WaterJet Cleaning can be divided into two basic categories – **Manual** and **Automated**

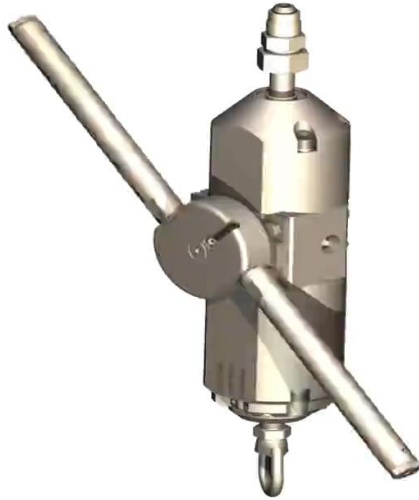
Manual



Automated



# UHP/HP WaterJet Cleaning Productivity



***The Leader in Water Jet Technology***

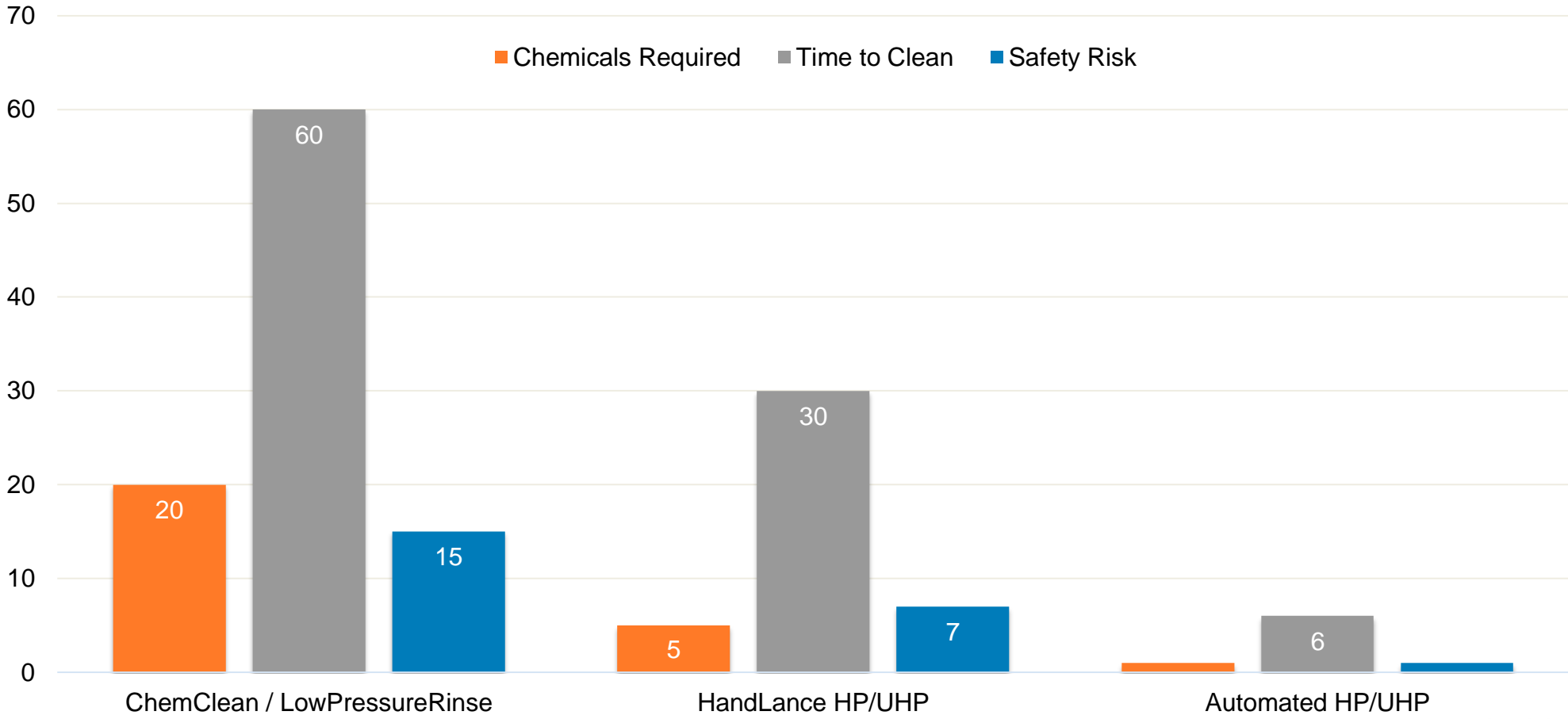
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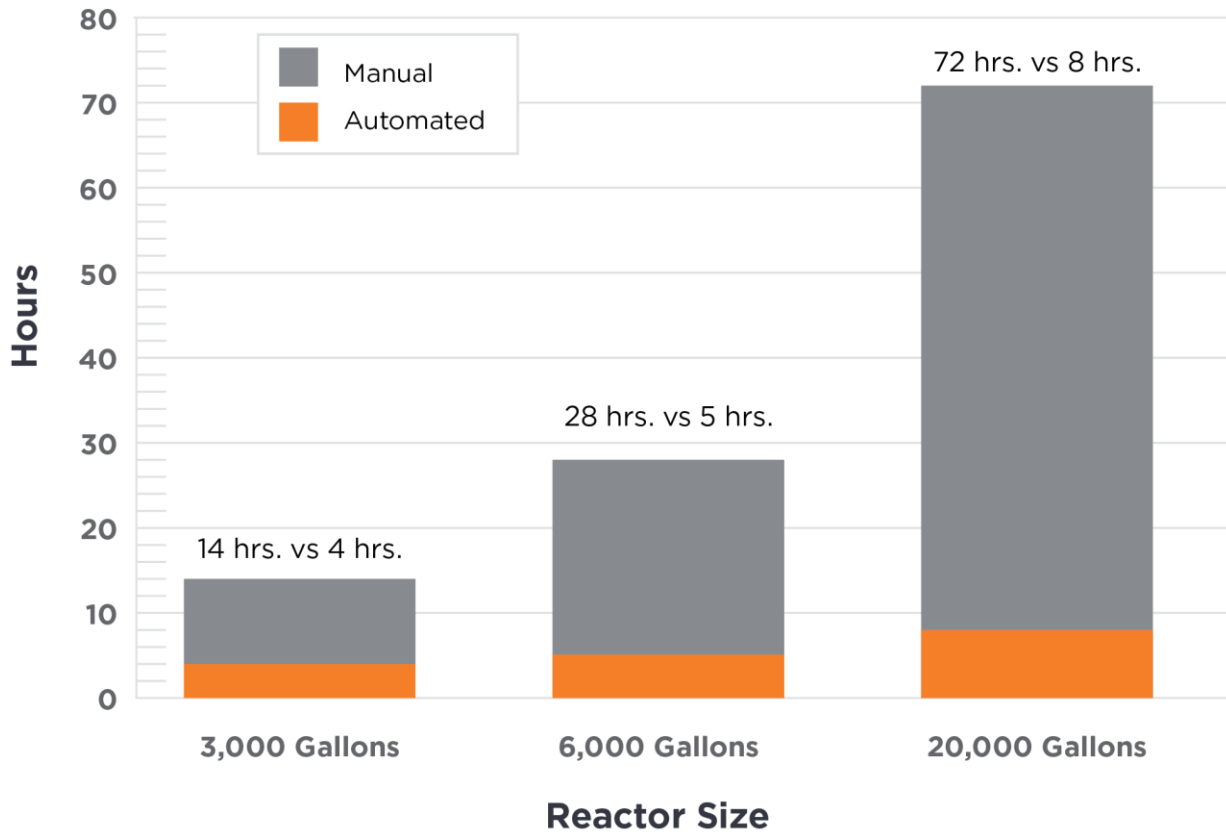
[www.nlbusa.com](http://www.nlbusa.com)

# UHP/HP WaterJet Cleaning Productivity

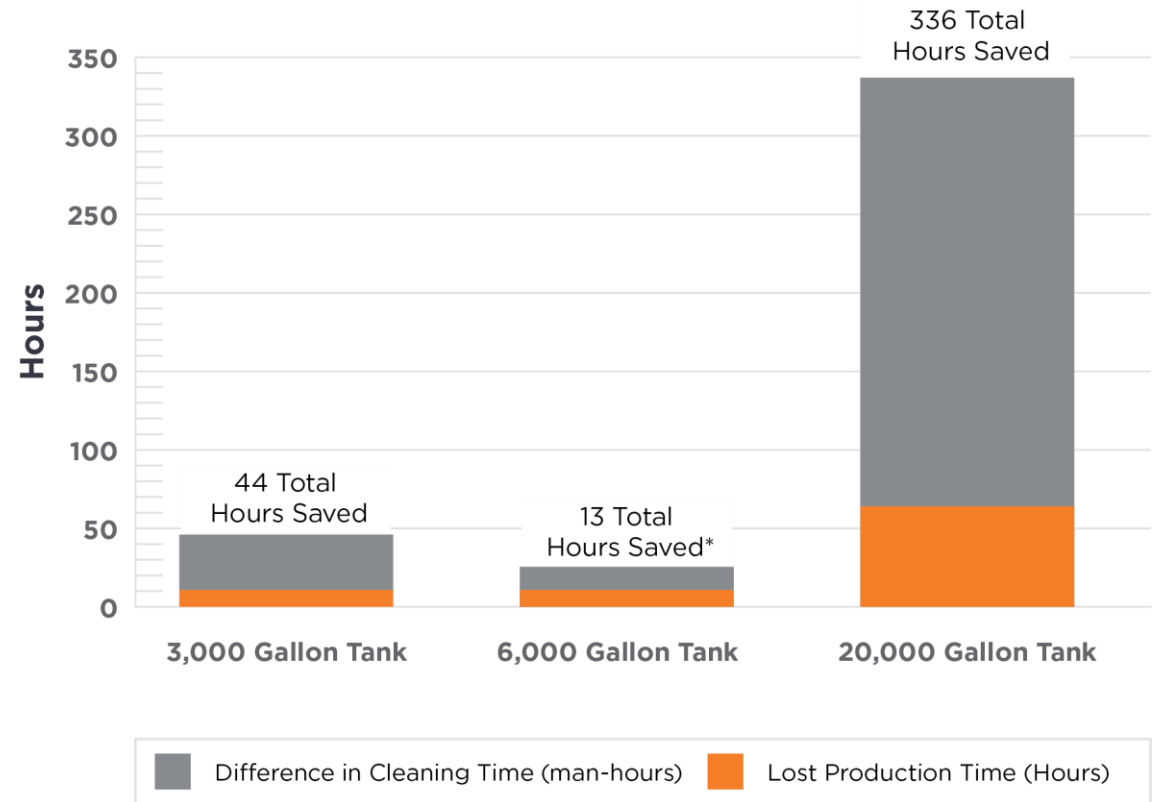


# UHP/HP WaterJet Cleaning Productivity

**PRODUCTION TIME LOST FOR TANK CLEANING**



**HOURS SAVED WITH AUTOMATED WATER JETTING**



\*The 6,000-gallon tank comparison is to chemical cleaning, which requires no man-hours. The 10 man-hours required for water jetting were more than offset by the savings (23 hours) in lost production time.

# UHP/HP WaterJet Cleaning Productivity

RESIDUE	PRESSURE (PSI) - UP TO:			
	5,000	10,000	20,000	40,000
Fats	█			
Mineral Oil Products (White)	█			
Adhesives	█	█		
PVC	█	█		
Latex	█	█		
Spray Tower Residues	█	█		
Concrete Residues		█		
Mineral Oil Products (Black)		█		
<b>HARDS:</b>				
Plastics		█	█	█
Dispersions		█	█	█
Paints			█	█
Silicon/PU			█	█
Varnishes			█	█
Plasters (Dental Gypsum, etc.)				█
Coke				█
Rubber				█
Drum/IBC Labels & Glue				█





# SAFETY

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## IN WATERJET CLEANING OPERATIONS

- Flow & Pressure
- Flow & Pressure = Thrust
- Personal Responsibility
- General Safety Issues
- Protective Gear (PPE)
- Safe Work Zone

# Flow & Pressure

**Flow** is the volume of water passing through the hose or nozzle.

- GPM (Gallons per Minute)
- LPM (Liters per Minute)
- Example: 20 GPM = 76 LPM
- Varying Flow depending upon type of product removal



**Pressure** is the force behind the water, as result of a restriction (nozzle) at the exit end of the hose.

- PSI (Pounds per Square Inch)
- BAR (Metric unit = 14.5 PSI)
- Example: 22,000 PSI = 1500 BAR
- Varying Pressure depending upon type of product removal



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**Flow** x **Pressure** = **POWER** (Thrust/Force)

- 10,000 psi x 10gpm is the same as
- 1,000 psi x 100gpm

(GPM x .052) x Square Root of Pressure

SqRoot of 40k = 200

SqRoot of 10k = 100

- Only use force equal to 1/3 of body weight

# Flow & Pressure = **POWER** (Thrust/Force)

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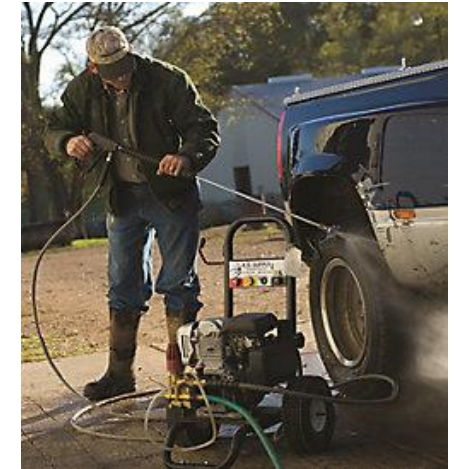
(GPM x .052) x Square Root of Pressure

SqRoot of 40k = 200

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- **Only use force equal to 1/3 of body weight**

Pump	Flow Rate (GPM)	Pressure (PSI)	Thrust Force (Ft lbs)
Pressure Washer	5	2,500	13
NLB 125 Series	5	10,000	26
NLB 125 Series	5	20,000	37
NLB 125 Series	5	40,000	53
NLB 225 Series	10	10,000	53
NLB 225 Series	10	20,000	74
NLB 225 Series	10	40,000	105



# Personal Responsibility

## BACK THRUST & HAND LANCING

- Prevent Fatigue, do not use force more than 1/3 of body weight

## PROPER STANCE

- Cradle the mount
- Do not lean back
- Keep weight centered betw feet
- Attention to footing and hoses
- Close trigger slowly and completely
- Never tie down the trigger



# General Safety Issues

- The **HP WaterJet Stream** can exit the tool at speeds in excess of 2,200 FPS.
- **System Failure** - Hose, Coupling or Tool breaks down and causes a Violent reaction
- An **Out-of-Control Tool** can cause serious injury before the Pump Operator can shut it down...
- A **Blow** from an **Out-of-Control Tool** can be Severe or even Fatal.
- **Chemicals** – understanding MSDS
- **Confined Spaces** - requires additional training



# Protective Gear (PPE)

**Eye Protection** – OSHA approved goggles or helmet/face shields

**Ear Protection** – OSHA approved ear plugs, headphones or both

**Body** – varying levels of outerwear

- Rainsuit & rubber/leather gloves (minimum)
- Turtle Armor Suit & HD gloves & Steel Toe
- Hazmat suit for Chemicals/Confined Spaces

**Training** - All Operators must be trained by qualified personnel so that they fully understand operations and potential hazards

1. TurtleSkin WaterArmor
2. Gaiters
3. Boots, with steel metatarsal
4. Hard Hat
5. Face Shield Holder
6. Face Shield
7. Goggles
8. Rubber Gloves
9. Wet Suit



# Safe Work Zone

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**SURE**  
**SHROUD**



**SUREWHIP™**



# Safe Work Zone

- Team Communication
- Hand signals / Comm's
- Med Card



## WARNING!!!

An injury caused by high pressure waterjets can be serious. In the event of any waterjet injury:

- Seek medical attention immediately. Do not delay!
- Inform the doctor of the cause of the injury.
- Show the doctor this card.
- Tell the physician what type of waterjet project was being performed at the time of the accident and the source of the water.

## IMPORTANT MEDICAL INFORMATION!

READ THIS PLASTIC CARD AND KEEP IT IN YOUR WALLET. IN THE EVENT OF A WATERJET INJURY, SHOW THE CARD TO YOUR DOCTOR.

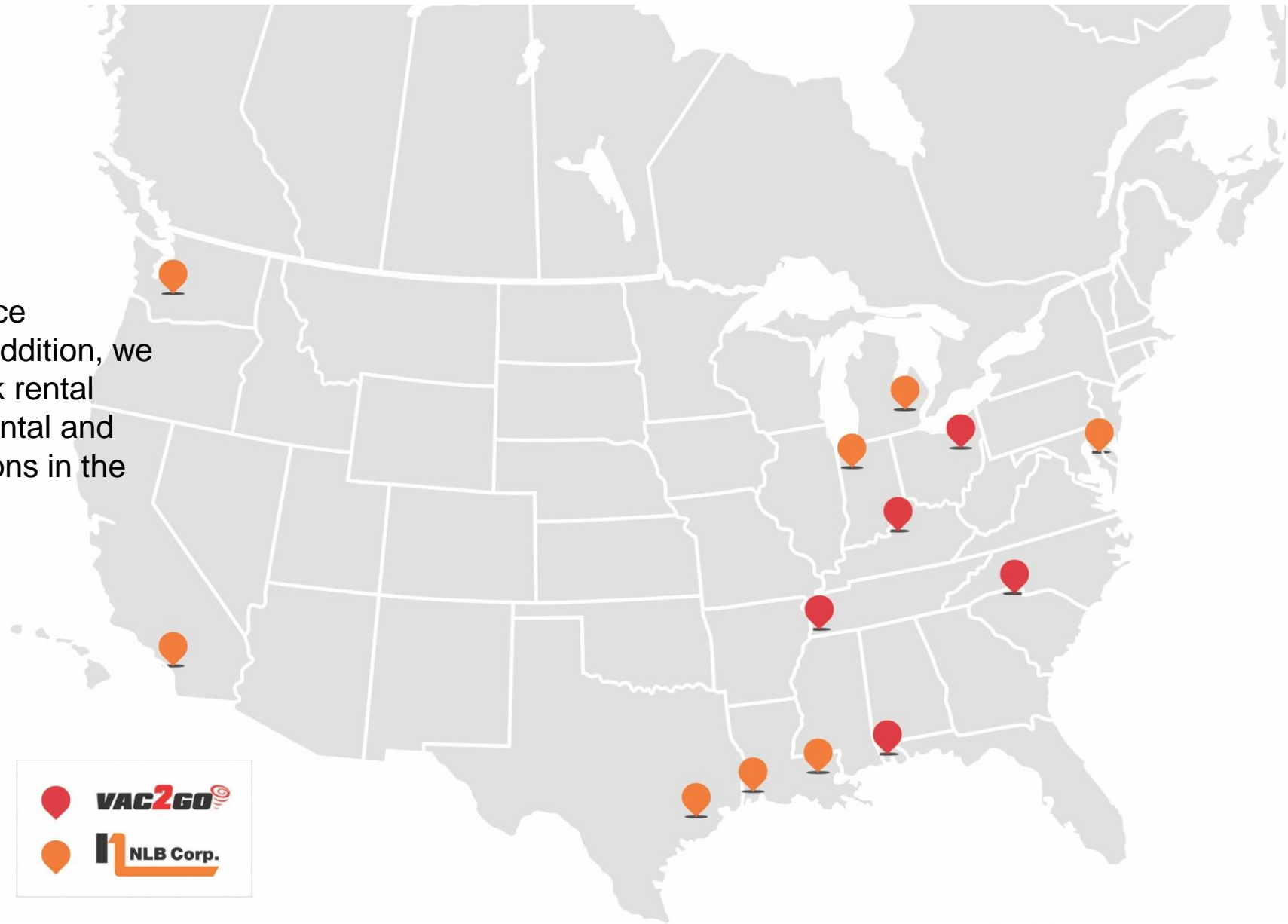
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## MEDICAL ALERT NOTE TO PHYSICIAN

This patient may be suffering from a waterjet injury. Evaluation and management should parallel that of a gunshot injury. The external manifestations of the injury cannot be used to predict the extent of internal damage. Initial management should include stabilization and a thorough neurovascular examination. X-rays can be used to assess subcutaneous air and foreign bodies distant from the site of injury. Injuries to the extremities can involve extensive nerve, muscle, vessel damage, as well as cause a distal compartment syndrome. Injuries to the torso can involve internal organ damage. Surgical consultation should be obtained. Aggressive irrigation and debridement is recommended. Surgical decompression and exploration may also be necessary. Angiographic studies are recommended pre-operatively if arterial injury is suspected. Bandages with a hygroscopic solution ( $MgSO_4$ ) and hyperbaric oxygen treatment have been used as adjunctive therapy to decrease pain, edema and subcutaneous emphysema. Unusual infections with uncommon organisms in immunocompetent patients have been seen; the source of the water is important in deciding on initial, empiric antibiotic treatment, and broad-spectrum intravenous antibiotics should be administered. Cultures should be obtained.

# Locations

NLB has regional sales and service locations throughout the U.S. In addition, we have partnered with vacuum truck rental company, Vac2Go to offer NLB rental and servicing at an additional 5 locations in the Southeast and Mid-Ohio Valley.



 **VAC2GO**  
 **NLB Corp.**

# Useful Links

## CONTAINER EXPERTS VIDEO

<https://www.youtube.com/watch?v=ZjQhCa8gJxE&feature=youtu.be>

## NLB WEBLINKS

<https://www.nlbcorp.com/products/accessories/safety/>

<https://www.nlbcorp.com/shop/safety/sure-shroud/>

<https://www.nlbcorp.com/shop/safety/whip-checks/>

<https://www.nlbcorp.com/applications/tank-tote-cleaning/>

