Fracing Pump Trucks

CONTRACT CLEANING CASE STUDY
DRY ICE BLASTING EFFECTIVELY Cleans PUMP TRUCK RADIATORS AND LEADS TO A SUBSTANTIAL INCREASE IN EFFICIENCY

COMPANY
Sharp Oilfield Services

APPLICATION
Clean radiators on pump trucks at fracing well sites

COLD JET SYSTEM
SDI Select™ 60

BENEFITS
Cleaning the radiators effectively leads to a considerable increase in pump truck efficiency.

Complete the job in a fraction of the time that alternative methods take to clean one radiator.

Environmentally responsible - No secondary waste is created.

OIL COMPANIES PREVIOUSLY CLEANED THE RADIATORS ON THEIR PUMP TRUCKS WITH A MIXTURE OF CHEMICAL AND PRESSURE WASHING. THIS PROVED TIMELY, REPETITIVE AND INEFFECTIVE, LEADING TO A DECREASE IN PUMP TRUCK EFFICIENCY.

THE SITUATION
Completing a fracing well is a multistep process. First, a well is drilled vertically into the ground until it reaches permeable shale layers and it is then redirected horizontally into the rock layers (about 7,000 to 12,000 feet below the surface). A mixture of water, sand and chemical lubricants is then pumped into the well at high pressure by the pumping trucks. At each well, there are up to 40 high pressure pump trucks, each using roughly 2,500 horse power to pump a combined 100 barrels of fluid a minute into the well. This mixture of water, sand and lubricants will begin to fracture the shale rock and the sand will enter the fractures and prevent them from closing. The natural gas will then begin to seep out, to be collected by the well. It takes extreme pressure to create these fractures so the pumping trucks need to operate at peak efficiency.

THE PROBLEM
The pumping trucks are exposed to oil, dirt, engine soot, frac sands and other residues at the well sites. This residue settles on the trucks and begins to build up on the radiator. The radiator, which cools the engine, will then operate less efficiently, not allowing the trucks to run out of first gear. If the truck is operated at different gears or at higher rates, the engine will overheat, resulting in the trucks only able to pump ~30 barrels per minute of the water, sand and chemical mixture into the well. The project calls for 90-100 barrels per minute.
In order for the trucks to continue to operate at peak efficiency, the radiators must be periodically cleaned. The traditional method of cleaning the radiators required that the truck be brought back to a company’s shop, the radiator disassembled and then sprayed with a chemical foam and pressure washed. This is a timely process that must be repeated several times before the radiator is relatively clean. This method can take up to seven hours and the radiators would still not be fully cleaned. Power washing also mixes water with the dirt and contaminants, creating a sludge, which gets stuck in the radiator because the water is not able to fully pass through it.

There are also environmental concerns with using chemicals to clean. The water becomes contaminated with the chemical and puddles accumulate below the cleaning area. This water must be contained and disposed.

THE SOLUTION
Sharp Oilfield Services, located in Gainesville, Texas, looked into dry ice cleaning as an alternative cleaning method for a large oil company. Sharp performed a demonstration of the solution right after the company had cleaned the radiators with pressure washing. They re-cleaned the areas that were just pressure washed with dry ice.

“Once we started to demonstrate dry ice blasting for the company and they saw how effective it was, they realized that power washing was not fully cleaning the radiators.”

Cold Jet dry ice cleaning system’s use non-abrasive media in the form of recycled CO$_2$ pellets that will not damage surfaces or equipment. The combination of dry ice cleaning’s kinetic energy and thermal effect breaks the connection between the dirt and surface, lifting away contaminants. Unlike blasting with other media, dry ice cleaning does not leave any secondary waste, because the dry ice particles sublime upon impact – converting from solid to gas. Dry ice cleaning is safe and non-toxic, does not create downstream contamination and reduces or eliminates employee exposure to dangerous chemical cleaning agents.

The oil company was impressed and decided to contract Sharp to clean their radiators.

THE RESULTS
Using the Cold Jet Select 60 with the 90 degree access, full pressure nozzle, it takes Sharp 20-90 minutes to clean one radiator, depending on the severity of how dirty it is. This is only a fraction of the time it previously took, which was nearly seven hours per radiator.

Dry ice cleaned the radiators much more effectively and the pump trucks were able to run at full capacity. When using the alternative method, the pumping trucks were only pumping around 30 barrels per minute. After cleaning the radiators with dry ice, the trucks were pumping around 100 barrels per minute.

“After we cleaned it, they were able to run it at peak efficiency,” said Austin. “It’s essentially like having a brand new unit.”
Dry ice cleaning is also environmentally responsible. The process eliminates chemicals from the cleaning process and does not generate any secondary waste. The Environmental Protection Agency (EPA) monitors fracking well sites closely and eliminating the chemicals is a major benefit.

“The fact that we do not have any secondary waste besides the product that we are blasting off of the radiator is really appealing to the oil companies,” said Austin. “We are also not muddying up the location with water from pressure washers.”

A typical job for Sharp is 21-22 pump trucks and some trucks will have multiple radiators. With a three man crew, Sharp uses about 50 pounds of block dry ice per radiator.

Sharp finds a lot of value in the SDI Select 60 machine. “The niche for the machine is blasting a soft enough particle without damaging the radiator fins – even if you break down a pellet, it is too rough for some of the fins and may damage them,” said Austin. “The SDI Select 60 is a great machine. It covers both ends of what we can do – it can get aggressive, but also be very delicate.”

With the ability to shave any dry ice media input through patented feeder technology, the SDI Select 60 opens new cleaning opportunities for users who experience limited dry ice availability. The machine can use any Aero blasting machine nozzle or accessory to suit any application, and can be as gentle or aggressive as necessary - with blasting pressures ranging from 20 to 250 PSI - covering the widest range of applications in a single machine in the industry.

Sharp has experienced a lot of success after incorporating dry ice cleaning into their service line. They operate throughout the country and have crews working full time in West Texas, Oklahoma and Colorado and have 10 SDI Select 60 systems in rotation. Sharp operates a 24/7 mobile unit and can clean trucks anywhere at any time. It has been so successful that they are starting a new business dedicated just to dry ice cleaning.

“We are trying to find four to five areas that we can specialize in when it comes to dry ice blasting,” said Austin. “We currently serve the oil field side, but we are looking at other industry options, including wind energy and marine.”