Filtration for Heavy-Duty Fracking Equipment

A dizzying array of oilfield equipment is helping drive the current U.S. oil and has boom and LUBER-FINER® offers premium filtration products to keep operations humming along

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The recent growth in oil and natural gas development in the United States has made some familiar superlatives relevant again, chief among them "boom," "golden age" and "black gold rush." The increase in production has been so significant that the International Energy Agency (IEA) concluded in November 2012 that the "U.S. will surpass Saudi Arabia as the world's largest oil producer by 2020." Driving this remarkable growth has been advanced technologies like horizontal drilling and hydraulic fracturing (fracking) that make what were thought to be unreachable deposits in the vast shale fields of North Dakota and Montana (Bakken), Texas (Eagle Ford), Colorado and Wyoming (Green River/Niobara) and the wide swath cutting across Ohio, Pennsylvania, West Virginia and New York (Marcellus/Utica) both recoverable and, just as important, economically viable.

The tangible result of all of this increased drilling and recovery activity is that in September 2012 the U.S. Energy Information Administration (EIA) reported that U.S. crude oil production averaged nearly 6.5 million barrels a day, which was the highest daily average since 1998. Additionally, the EIA reported that in January 2012, nearly 2.6 trillion cubic feet of natural gas was produced in the U.S., the highest recorded monthly level in history.

In conjunction with these headline-grabbing developments, the new oil and gas boom has also been a boon to the manufacturers and suppliers of the heavy-duty equipment that is necessary for an oil and gas exploration and production operation to function and thrive. For example, in December 2012 energy-market research firm The Freedonia Group released a report that predicted that demand for oil and gas infrastructure equipment in the U.S. will increase 6.3% annually through 2016 to a total market valuation of $12 billion, with most of the expected growth driven by increased drilling activity in unconventional areas.

With that in mind, this white paper will focus on the various types of heavy-duty equipment that are required in a horizontal drilling/hydraulic fracturing operation, the challenges that operators face in keeping the equipment operating effectively and efficiently, and the types of heavy-duty filtration products that can help provide peace of mind in these critical operations.

The Challenge

Simply put, most drilling for oil and natural gas takes place in extremely harsh environmental conditions, with extreme heat or cold (and sometimes both), and all types of airborne particulates, such as dirt, dust and smog. These harsh conditions require equipment that will operate reliably when called upon, which can often mean a 24/7/365 production cycle. The optimum equipment for these operating conditions is that which delivers maximum Mean Time Between Repairs (MTBR). This means that the equipment is highly reliable, and when service is required, it must be able to be performed simply and efficiently. It also means that if any parts need to be replaced, the manufacturer or distributor must have the capability to offer optimized lead and delivery times.

Keeping an oilfield operation working at its efficient best requires a hand-in-glove working relationship between two main parties: the operator and the drilling contractor. The operator is responsible for the well itself and the overall upkeep of the drilling site, and contracts for all services and materials that are not associated with the drilling rig. The drilling contractor, on the other hand, is responsible for the drilling rig and crew, along with the procurement of all rig-associated services.

Put together, these two distinct entities employ a dizzying array of heavy-duty equipment. A conservative list of heavy-duty equipment that is required at the wellhead to initiate and then complete a shale oil and gas horizontal drilling/fracking operation would include:

- **Earth-Moving Equipment.** Used to clear well locations and dig trenches for pipelines
- **Power Gen Sets.** Used to generate power for all of the drilling rig's hydraulic and electrical systems
- **Draw-works.** Hoisting machinery used as a means of raising and lowering a drilling rig's traveling blocks
- **Frack Pumps.** Used to pump fracturing fluid into the wellbore
- **Mud Pumps.** Used to transfer drilling fluids into and out of the wellbore
- **Mud Tanks.** Used to store drilling fluid on a drilling rig
- **Blenders.** Used to blend and deliver a high rate of fracturing fluids into the wellbore
- **Chemical Trailers.** Used to transport fracking chemicals to the drilling site
- **Air Compressors.** Used to power pneumatic drills
- General-Service Compressors. Used to facilitate transfer of drilling debris and waste liquids
- **Excavators.** Used to transfer drilling debris to storage bins for disposal

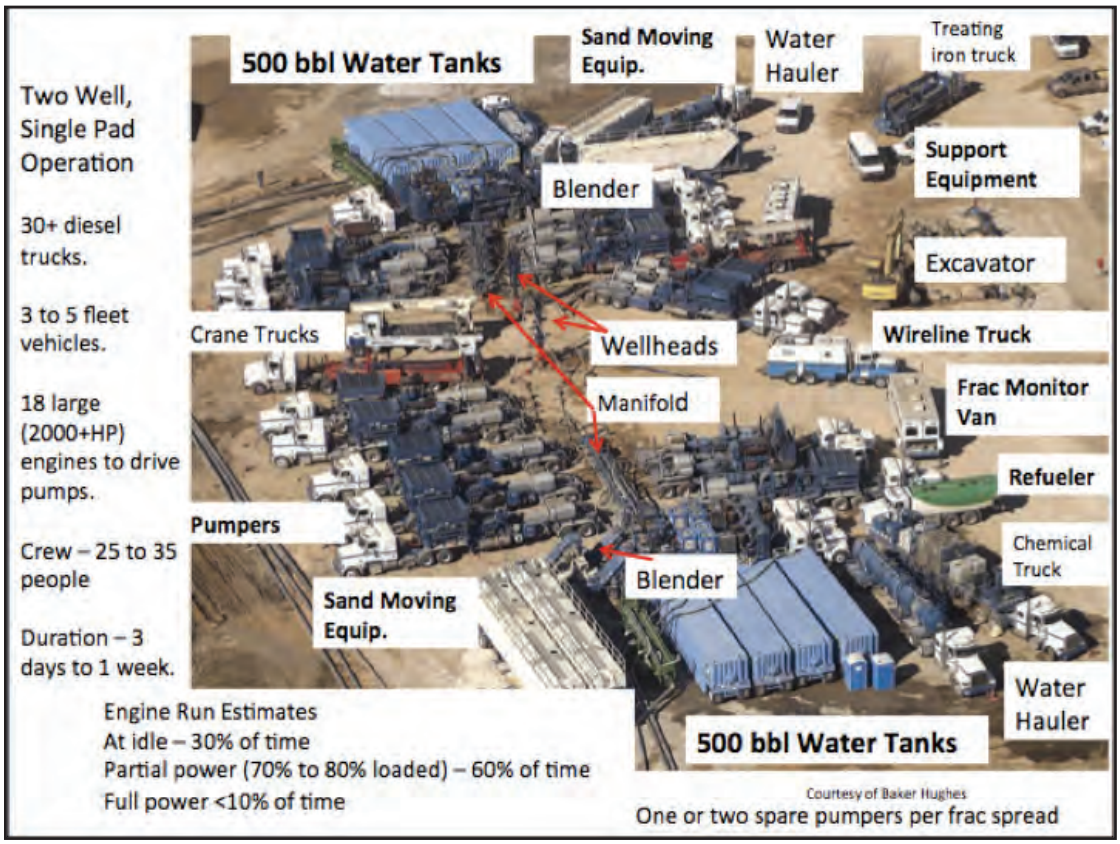

Image to the left: This is an example of a Fracking site. Call outs describe the equipment used. The Fracking stage has the highest concentration of heavy-duty equipment in the oil and gas well production.

- **Shale Shakers.** Used to remove large solids from the drilling fluid, or "mud"
- **Sand Conveyor.** Used to deliver frack sand to the wellbore for hydraulic fracturing operations
- **Telehandler Units.** Used to move drilling pipe to various locations on the wellpad
- **Bulldozer With Forklift.** Used to move drill pipe and reposition other pieces of equipment
- **Various Hydraulic Systems.** Cranes, catwalks and roughneck collars are examples of this type of equipment, which is part of the drilling rig
- **Vacuum Degasser.** Used to filter out impurities in the recovered oil and gas
- **Centrifuges.** Used to remove sediment from oil and natural gas
- **Lighting Units/Generators.** Used to provide light at night and power for the work trailers
- **Forced Air Heaters.** Used to provide heat to the drilling site in cold-temperature areas
- **Wheel Loader With Bucket.** Used to transport drilling debris and other construction materials around the drilling site
- **Miscellaneous Trucks.** Used by mechanics, electricians, contractors and parts-suppliers at the drilling site, and to transport crew to and from the wellpad

The bottom line is that all of this heavy-duty equipment must be ready to meet the needs of the drilling operation when called upon. A time-consuming breakdown of any piece of equipment can have a deleterious effect on the entire drilling operation, which can result in compromised product recovery rates, along with a corresponding monetary hit to the operator's bottom line.

The Solution

As mentioned, the growth in oil and gas production in the U.S. has not only been a boon to the E&P companies, but also to those companies that provide the equipment necessary to keep the operation running smoothly. Heavy-duty equipment contractors recognize the overriding importance of proper equipment selection. Hand in hand with that they know that pairing the right machines to the specific job is critical in maximizing production.

Part of that operational-efficiency equation is choosing heavy-duty equipment components—for our purposes, "filters"—that have been proven to operate reliably in even the most trying operating and climactic conditions. Since 1936, Luber-finer®, which became a division in FRAM Filtration in 2012, has been providing premium filtration solutions for heavy-duty equipment. The Luber-finer filtration

technologies that can help optimize equipment performance and uptime in shale oil and gas operations at the wellhead include:

- **Lube Filters.** OEM-quality lube filters from Luber-finer are available in full-flow, by-pass, high-efficiency and extended-life options. All styles have been engineered with specifically formulated media to provide maximum protection against equipment breakdown.
- **Fuel Filters.** Luber-finer fuel filters provide the highest in fuel-cleansing efficiency and capacity thanks to their ability to trap harmful contaminants such as dirt, water, scale and rust before they can reach the fueling system.
- **Air Filters.** Luber-finer air filters are constructed with specially blended filter media for optimal dirt-holding capacity, filtering efficiency and maximum protection from harmful airborne contaminants.
- **Hydraulic Filters.** Luber-finer hydraulic filters have been designed to meet heavy-duty equipment demands every day. The specialized hydraulic media removes harmful particles and contaminants in the hydraulic fluid thanks to a constantly changing fluid path that forces contaminants through an intricate maze of particle-trapping media.
- **Coolant Filters.** Luber-finer coolant filters and products are quick and easy to install and service, resulting in reduced downtime and costs with a corresponding increase in equipment life.
- **Cabin Air Filters.** Luber-finer cabin air filters remove dust, smog, bacteria and any other contaminants from air before it can reach the vehicle's interior, meaning that the driver and any passengers are only breathing clean air. Maintenance is also easy as most cabin air filter changes take only 15 minutes to perform.

All Luber-finer heavy-duty filtration products combine groundbreaking research and development procedures performed by a dedicated team of filtration-industry experts. That means that no matter what filter is chosen from Luber-finer's range of oil, air, fuel, hydraulic, coolant or cabin air products oilfield operators can count on high performance and the ultimate in reliability.

Conclusion

Recent developments guarantee that oil and natural will continue to heat our homes, fuel our vehicles and contribute to the manufacture of many of our most necessary products for many decades to come. The efficient, cost-effective and safe recovery of these products will only add to their status in the energy marketplace. But such a complicated operation can only thrive when it features equipment—from draw-works to shale shakers to light-duty trucks—that can be relied on to perform when needed.

Aerial image of a fracking operation - Google Earth

In the harsh conditions of the oilfield, where dirt, dust and a long list of other contaminants—along with the demands of a 24/7/365 operating cycle—combine to put heavy-duty equipment under constant assault, reliable filtration is a necessity. Luber-finer has taken all of this into consideration when designing and manufacturing its various lines of heavy-duty filtration products, secure in the knowledge that a fracking operation that utilizes them will reap the ultimate return in product recovery and efficient, reliable equipment performance.

For more information on Shackleford Enterprises, please visit www.luberfinerenergy.com

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Luber-finer® has been a trusted name in filters for more than 76 years. Today, Luber-finer® is Built To Do More™ by offering exceptional customer service, leading product development and unique digital strategies that help customers improve their performance and efficiency. For more information and the latest in heavy-duty filtration from Luber-finer®, please visit www.luberfiner.com or call (800) 851-3641. You can also follow Luber-finer® on Facebook, Twitter, LinkedIn and YouTube.

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