



A Berkshire Hathaway Company

LiquidPower Specialty Products Inc.

PIPELINE FLOW IMPROVER SOLUTIONS

LiquidPower
FLOW IMPROVERS

ExtremePower
FLOW IMPROVERS

RefinedPower
FLOW IMPROVERS



THE LEADING GLOBAL PIPELINE DRA PROVIDER

LiquidPower Specialty Products Inc. (LSPI), a Berkshire Hathaway Company, is the global leader in the science and application of drag reduction. LSPI specializes in maximizing the flow potential of pipelines, increasing operational flexibility and throughput capacity, and substantially increasing efficiencies.

LSPI offers a full service solution that encompasses industry-leading technology, quality manufacturing, technical support and consulting, reliable supply chain, injection equipment and field service. This approach ensures that pipeline operators receive best-in-class outcomes from their drag reducing agents (DRA) installations. With this comprehensive approach, customers can focus on pipeline operations, and depend on LSPI for reliable, high performance DRA products and services.



Flow improvers, also known as DRA, are injected into pipeline fluids to reduce turbulence. The associated reduction in frictional pressure drop can provide significant benefits to pipeline operators by providing additional pipeline throughput, the ability to operate in reduced pressure-drop conditions, or a combination of these effects.



FLOW INCREASE

DRA lowers frictional pressure loss by reducing turbulence in the flow. This change allows operators to increase throughput and earn more tariff. Drag reduction agents from LSPI have doubled the throughput of many pipelines.



CONSTRAINT REMOVAL

Is there a bottleneck in your pipeline? A segment that restricts throughput of the entire line? DRA effectively alleviates the constraint of a bottleneck segment, thereby allowing the flow rate across the entire pipeline to be increased.



ENERGY MANAGEMENT

Reducing the frictional pressure in a pipeline also saves pumping energy. LSPI has supplied many applications where entire pump stations have been bypassed. By allowing shutdown of intermediate pump stations, energy and maintenance costs can be dramatically reduced.



PRESSURE REDUCTION

Sometimes operators need to reduce the operational pressure in a pipeline. DRA is a fast and effective tool to reduce and control pipeline pressure without compromising throughput.



RESULTS WITHOUT LARGE CAPITAL EXPENDITURES

Pipeline performance can often be improved without major capital investment. DRA is injected directly into pipeline products using skid-mounted injection pumps and tanks. Installation of a DRA skid enables pipeline operations to see reliable results, without any changes to existing pipeline steel.



TEMPERATURE MANAGEMENT

DRA can be used to reduce (heat generating) pump energy input. Pipeline operators have used DRA to reduce the arrival temperature of heavy crude oil. DRA treated liquids also have been shown to lower heat transfer properties, which at times will reduce heat loss to the surroundings, particularly in submerged pipelines.



Injection Equipment & Field Service

LSPI ensures reliable field operations by offering an integrated systems approach. Equipment is designed to optimize LSPI product injection reliability, while a network of field service representatives (FSRs) provides preventative maintenance at injection sites.



Global Supply Chain Reliability

LSPI's global distribution management team coordinates and executes product deliveries to customers on a worldwide basis. Inventories are managed and monitored, with deliveries scheduled to coordinate with customer needs. Logistics assets include multiple product warehouses and trans-loading facilities strategically located around the world, linked with a dedicated fleet of tanker trucks.



Leading Technology

LSPI operates the world's foremost research and development center dedicated to drag reduction technology. The LSPI research and development team consists of over 20 technical professionals, with over 200 years of combined drag reduction experience. Since inventing and commercializing the very first drag reducer for crude oil pipelines in 1979, LSPI has remained the global market leader in flow improver technology.



Quality Production

LSPI is the largest manufacturer of pipeline DRA, under strict quality standards. With the addition of the new plant, LSPI will have manufacturing capacity in excess of global demand for drag reducing agents. LSPI is certified to ISO 9001:2015 quality standards.

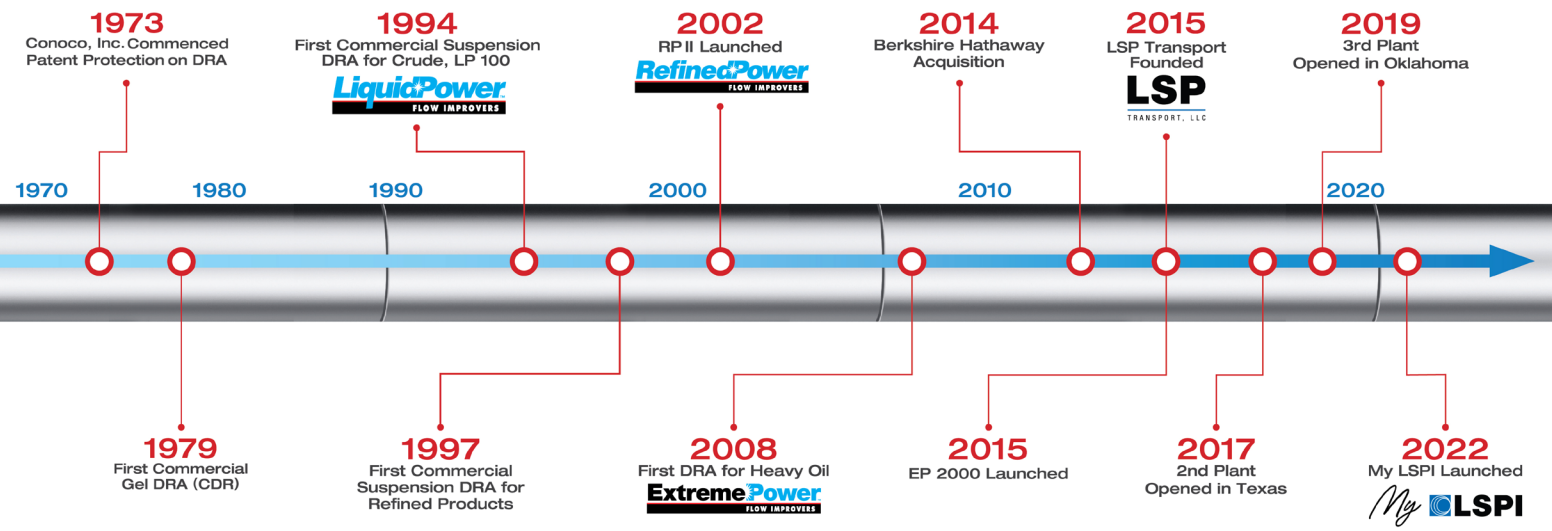


Technical Support & Consulting


LSPI personnel are recognized authorities at evaluating, implementing, and maintaining successful DRA field applications. LSPI experts interact with all levels in our customer's organization from pipeline modeling for business development to optimization for field operations.



LSPI invented, patented, and commercialized the first drag reducer for conventional crude oil and refined products applications over 35 years ago.



Since that time, LSPI has been the world-leading DRA technology pioneer; introducing LiquidPower™, the first suspension-based DRA; RefinedPower®, the first suspension based DRA for refined products; and ExtremePower®, the first DRA developed specifically for heavy crude oil.



☒ Light Crude

☒ Medium Crude

☒ Heavy Crude

☒ Condensate

☒ Multiphase Applications

LP 100 sets the industry benchmark for light crude oil drag reduction and is the most widely used DRA in the world. Other LiquidPower Flow Improver products are available for medium crude slates; prolonged exposure to freezing temperatures; multiphase flow; and a new low dosage formulation. LSPI’s LiquidPower Flow Improver can provide 80 percent or greater drag reduction.



☒ Heavy Crude

As crude oil gravities fall below 23° API gravity, traditional DRAs become ineffective and uneconomic. LSPI offers a true, heavy oil drag reducing agent. ExtremePower has proven effective in multiple heavy oil grades: including Western Canada Select, Castilla, Meray, SJVH, and Petrozuata. It can provide greater than 50 percent drag reduction. If you have a heavy oil pipeline operating in turbulent, or near-turbulent, conditions, ExtremePower Flow Improver could be your solution to achieving greater throughput.



☒ Refined Products

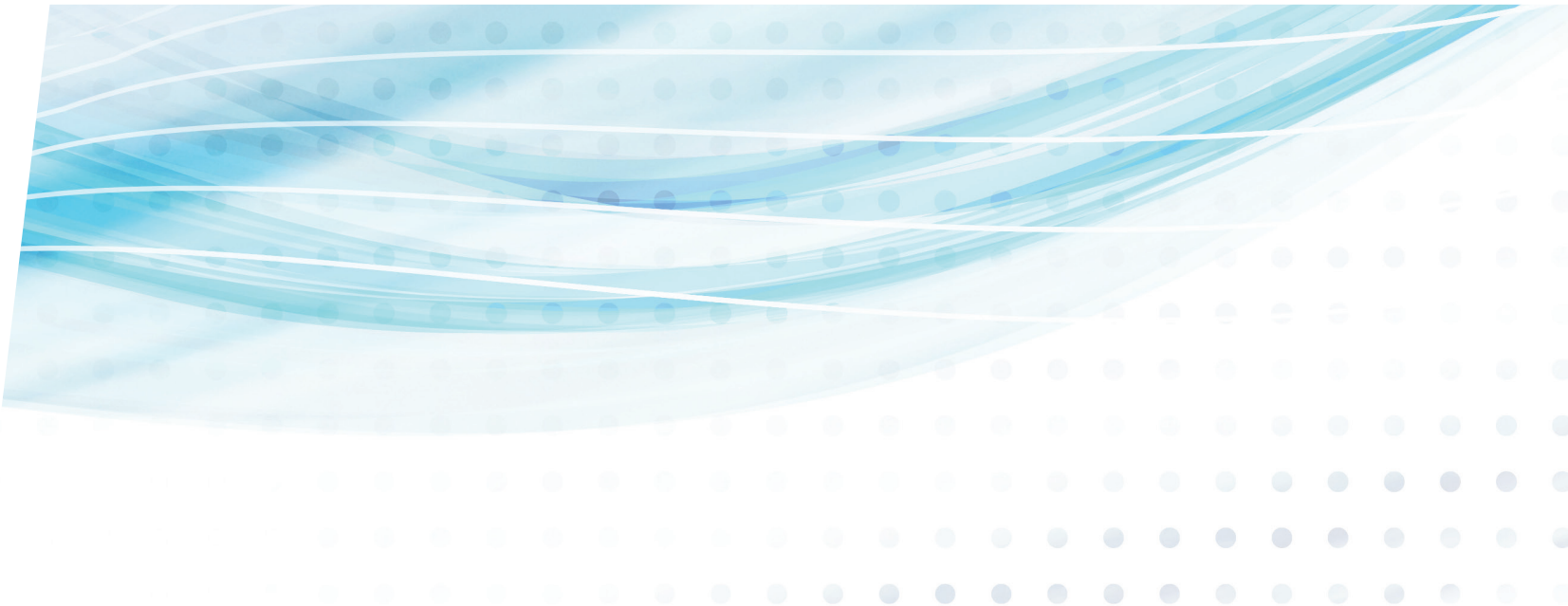
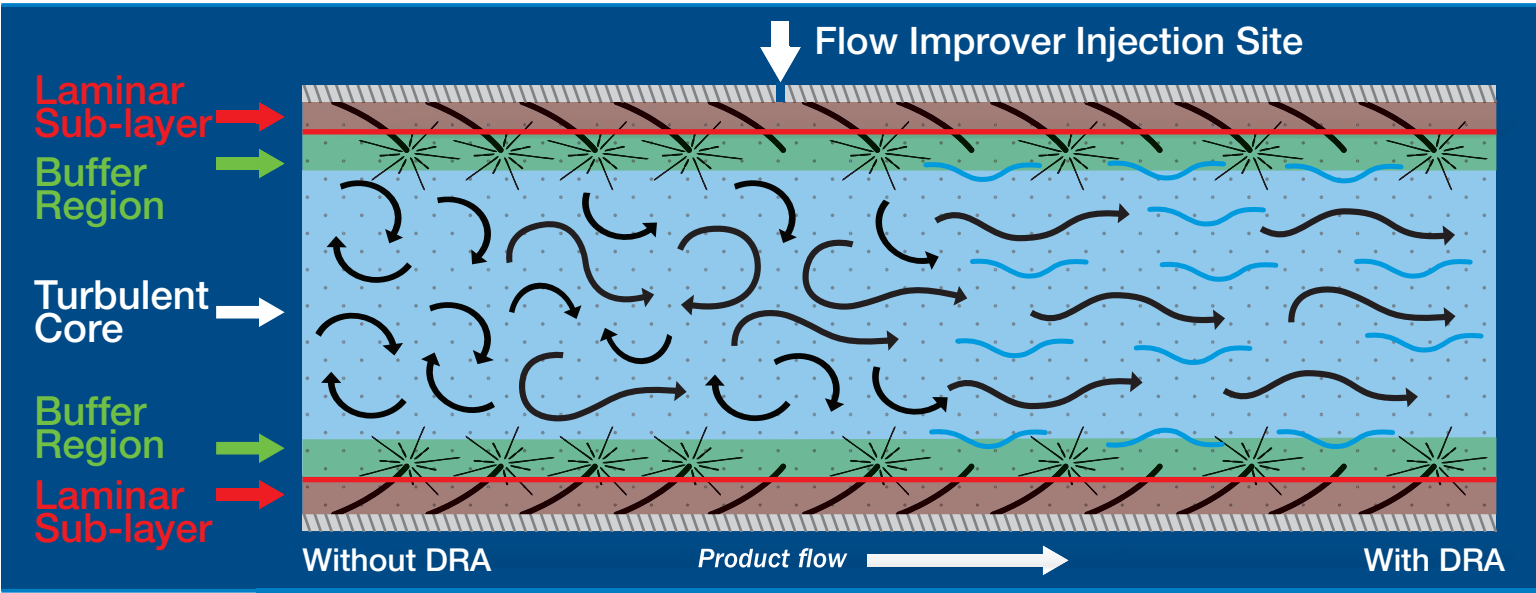
☒ Natural Gas Liquids

RefinedPower, RP II, is the most widely used clean fuel products DRA in the world. Used in gasoline and diesel applications, it is engine-tested, and formulated to be free of elements that can harm fuel quality. Regulation prohibits DRA use in jet fuel. RP II is nonaqueous based. Low dosage rates provide high levels of drag reduction performance.

HOW DO FLOW IMPROVERS WORK?

Flow Improvers are injected into pipeline fluids to reduce turbulence.

Flow Improvers, such as LiquidPower, ExtremePower, and RefinedPower, contain long-chain hydrocarbon polymers that suppress the growth of turbulent bursts. Flow in the core becomes less turbulent, and the frictional pressure drop along the pipeline is reduced.



For additional details on what the LSPI Flow Improver product would be right for your pipeline, we encourage you to call us at 1-800-897-2774 to discuss your specific application.



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