

# DuPont™ Krytox® the *Ultimate* High Temperature Lubricant

## DuPont™ Krytox® for Power Generation Applications

DuPont™ Krytox® lubricants are ideal for many applications in Power Generation facilities due to their high temperature stability, chemical inertness, low volatility, and total non-flammability.

Krytox® has been in use in the Power Generation industry for over 20 years in many applications including Turbine auxiliary systems on Siemens-Westinghouse, Mitsubishi, and GE models and in a wide variety of Power Plant MRO (Maintenance, Repair, and Operations) applications such as gearboxes, dampers, ductwork valves, steam valves, gaskets, seals, compressors, bearings, boilers, pumps, etc...

Krytox® lubricants offer unique performance and stability characteristics vs any alternative technology resulting in improved equipment performance and reduced cost.

Krytox® oils and greases are produced as a derivative of Teflon®. As a result these fluoropolymer lubricants exhibit exceptional thermal stability and lubricity. They are 100% non-flammable and will not oxidize/carbonize. Use of Krytox® lubricants can eliminate downtime, component failure, maintenance effort, and cost in harsh, high temperature (225°F - 750°F) applications.

In 2001 Krytox® XHT oils & greases were introduced, improving temperature capability to 750°F. Use of Krytox® oil @ 680°F has been demonstrated in a conventional turbine application.

In a sulfuric acid plant, temperature control is critical for the efficient conversion of sulfur dioxide to sulfur trioxide. For more than two years, PNM has depended on Krytox® to lubricate the packing of five knife-gate valves which control these temperatures. The valve stems are constantly exposed to the highly concentrated gas stream at temperatures between 300°F and 500°F.

“In this highly corrosive environment, any type of conventional grease we’ve used collects on the valve stem and binds it up in the packaging so that the valve can not open or close,” said working foreman, Wayne Darnell.

In the past, PNM had to replace the packing and refinish the valve stem at least every six months during the scheduled outages, or shutdowns, for regular plant maintenance. Failed valves have also caused unscheduled outages, resulting in costly downtime.

“During the last outage,” Darnell explained, “we didn’t have to rebuild any of the valves. We haven’t had to yet since we took them apart last year and first packed them with Krytox®.”

“Krytox® has done two important things for us,” concluded Frank Aragon, maintenance supervisor. “It’s allowed for smoother operation of the sulfuric acid plant because of improved temperature control and it’s also reduced the manhours required for maintenance. Regular relubing with Krytox® is easy. And in the long run, it’s saving us time and money.”



*At PNM's sulfuric acid plant, Krytox® keeps knife-gate valves running smoothly at optimum temperatures. Shown here are the valve stem and packing gland.*

## PNM Cleans Up with DuPont™ Krytox®

Supplying electricity to New Mexico, Arizona, California and surrounding Southwestern states means that the Public Service Company of New Mexico's San Juan Generating Station burns coal – and lots of it. Committed to safeguarding the environment, the station scrubs and converts its sulfur dioxide by-product at its sulfuric acid plant. Playing a key role in this clean-sweep operation, DuPont™ Krytox® grease lubricates temperature control valves to keep processes running smoothly.

## Performance & Peace of Mind: Low-Level Radiation Service

At its Salem Nuclear Power Station in New Jersey, the Public Service Electric and Gas Company (PSE&G) uses DuPont™ Krytox® lubricants in various bearing applications. Used to protect the bearings of critical sump pumps, Krytox® oil is superior to mineral oil because, unlike mineral oil, it is heavier than water. Any water that does leak in will float to the top of the bearing cavity, leaving the bearing properly lubricated. In addition, Krytox® oil is fire-proof, a major consideration for its use. It also extends oil change intervals.

Krytox® grease has also replaced mineral-based greases in the pillow-block bearings of fan-coil units and control-rod drive mechanism fan motors. These bearings are operated at high temperatures which cause the mineral-based greases to thicken. Typically the

bearings had to be repacked several times during each fuel cycle. Moreover, the location of the bearings within the reactor containment made regreasing difficult except under conditions of high heat and high humidity.

By formulating Krytox® grease with a corrosion inhibitor, which also acts as an anti-wear agent, DuPont was able to offer PSE&G a lubricant specifically tailored to its needs. Since Krytox® grease was put into service in December 1987, PSE&G has not had to replace or repack these bearings. DuPont also provided information on how much radiation Krytox® formulations could be exposed to and still maintain their chemical and physical integrity. Tests showed that Krytox® could be used up to about 10<sup>7</sup> rads.

Beyond its operating advantages, PSE&G values Krytox® for the safety it ensures employees. Since various components within the reactor containment are exposed to heat, humidity and radiation, the aim is to reduce the time that people have to spend in these areas. PSE&G protects its employees and its equipment by using Krytox® and putting DuPont technology to work for them.



New Jersey's Salem Nuclear Power Station

## Full-Steam-Ahead: Power Station Keeps Pace with Customer Needs

The Delaware City Power Plant supplies steam and electricity to one of Delmarva Power's largest customers – the Star Enterprise (formerly Texaco) Oil Refinery. Early this year the plant faced a dilemma. The grease it was using to lubricate the camshaft bearings for the inlet control valves on one of its three turbines had failed. High temperatures had caused the grease to thicken and solidify, freezing the turbine's controls. The plant needed to get parts moving again. Someone suggested DuPont™ Krytox®. Result: fully functioning valves within 24 hours.

Plant operators have tried other lubricants, including lithium- and silicone-based greases. But none of these match the performance of fluorinated Krytox® grease. Krytox® is thermally stable up to 600°F. It even outperforms the lubricant recommended by the turbine's manufacturer.

Heavy production demands mean that the plant schedules very few shutdowns for maintenance. This means that parts can't be taken apart and cleaned of old greases. Krytox® is simply added to whatever grease is already in the part. Interestingly, Joe Udinsky, Supervisor of Instrumental & Electrical, pointed out that Krytox® has a tendency to break

down these other greases which usually thicken after brief use. It even frees up clogged parts. Conversely, he said that adding more of the same grease will not loosen stalled parts; it only compounds the problem.

Krytox® so drastically improved valve operations that the plant began using it on other parts of the turbine exposed to a high-heat environment such as the cam follower roller bearings and valve train. Krytox® increases the service life of these critical components, minimizing downtime and reducing maintenance costs. said Udinsky, "Anywhere we need a high-temperature lubricant – we're switching to Krytox®."



Krytox improves valve operations of turbine components.

For more information or technical assistance, call: 800-424-7502 or visit us on the Web: [www.dupont.krytox.com](http://www.dupont.krytox.com)

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