

# NASH Steam Ejectors Last Stage Replacement

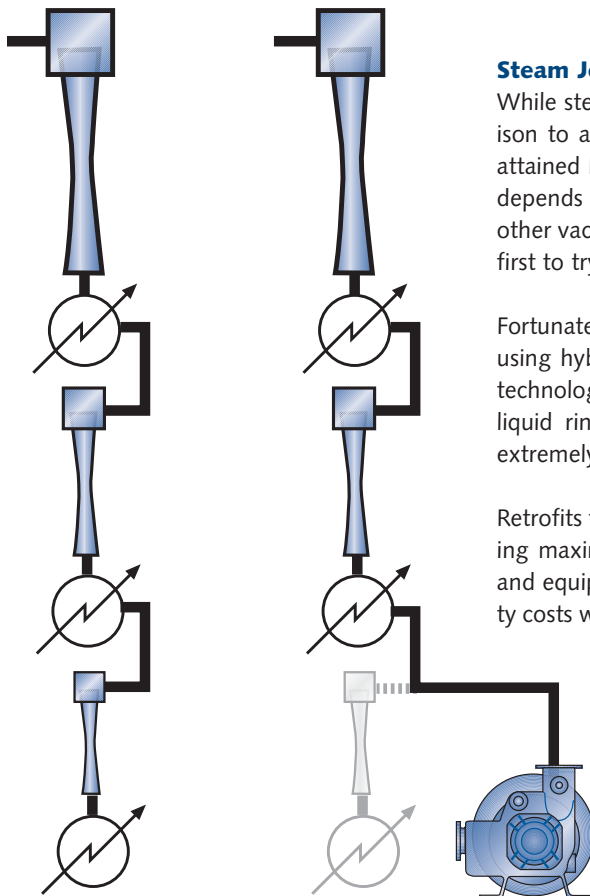


**The Vacuum Distillation Unit is one area where a large amount of energy can be saved with minimal footprint changes, greatly reducing utility costs with minimal changes to the process**

Equipment	Savings or (cost) US \$/year	Water savings or (cost) US \$/year	Total savings or (cost) US \$/year
Steam Ejector 3rd Stage savings/year	\$2,900,000	\$300,000	\$3,200,000
Vacuum Pump	( \$375,000 )	( \$20,000 )	( \$395,000 )
Totals	\$2,525,000	\$280,000	\$2,805,000

**Payback Time = 15 Months Saving \$2,805,000/year**

Assumed utility costs for VDU: Steam = \$18 per ton/hr (MMBtu); Electricity = \$0.065/kwh;  
Water Treatment = \$0.4/1000 gallons; Water = \$0.004/gallon; Operating Hours = 8400/year (assumes 2 week shutdown)



### Steam Jet Ejectors

While steam ejectors are very reliable, their actual efficiency is low in comparison to all other vacuum technologies. So, there is an inherent energy gain attained by moving to a different technology but there is also added risk that depends on the reliability of the new technology employed. The transition to other vacuum technologies has been very slow because no one wants to be the first to try out a new technology and bear the brunt of the learning curve.

Fortunately for refineries and chemical plants, there is a documented history of using hybrid vacuum systems in this application. Nash pioneered this hybrid technology when they combined their two technologies - steam ejectors and liquid ring vacuum pumps - in the 1980's to make a highly efficient and extremely reliable vacuum system.

Retrofits to meet current plant requirements are common and integral to reaching maximum efficiency and throughput. Recent advances in 3-D modeling and equipment development provide more opportunities to save on daily utility costs while improving the stability of the system for non-standard conditions.

These advances have led to new liquid ring vacuum pump designs that are 30% more efficient than those of 15+ years ago, and they have increased stability and flexibility when operating at different run rates. Also, current government stimulus programs for energy saving projects can make this the time to share the investment cost and update your vacuum crude tower. Investing to reduce operational costs is an easy decision today because the paybacks are in the range of 6 months to 3 years. This is a golden opportunity to save utility costs, reduce emissions, meet environmental regulations, improve production and, ultimately, increase profits.

### Engineering Expertise

The concept of system optimization is easy to discuss, but few companies can really engineer a vacuum system that truly optimizes the steam, pressures, condensers, vacuum pumps and all utilities - unless they actually manufacture all of the above. Nash engineers have this experience and they make it possible to re-engineer any steam ejector vacuum system into a hybrid system with reduced life cycle costs. An additional benefit of looking at the existing system design includes a strategic assessment of the existing equipment. This, in and of itself, can reduce costs since many systems are put in "set and forget" mode but could use some attention. Nash scrutinizes every detail of the system to make sure it will operate continuously and to the customer's desired expectations.



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