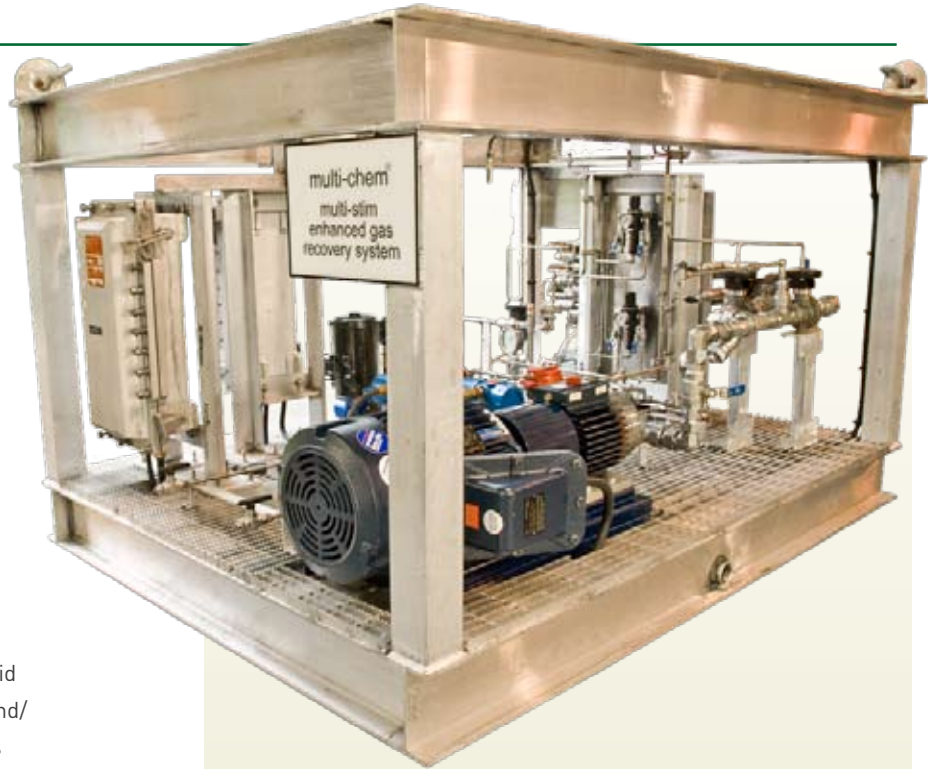


# multi-STIM<sup>®</sup> Enhanced Gas Recovery System

## An Automated Approach to Enhanced Gas Recovery

The application of liquid foaming agents in producing gas wells that are exhibiting liquid loading conditions has become the preferred method of enhanced gas recovery around the world. Great strides have been made over the past several years in developing both liquid foaming agent product lines and applications to improve the efficiency of this approach to enhanced gas recovery.



Many producing gas wells are currently being produced at optimized levels due to the continuous application of liquid foaming agents via annular and/or capillary injection, which is typically the preferred method of application if the completion design and/or production string allows.

While the continuous application of liquid foaming agents is typically the preferred method, this application becomes increasingly more difficult in liquid loaded gas wells both onshore and offshore where wells are completed with sub surface safety valves and/or downhole storm chokes. Maintaining continuous injection and inventory control of liquid foaming agents are challenges that are also encountered in wells producing on unmanned platforms and/or onshore wells that are located in remote areas that are not accessible during certain months of the year.



## WHAT IS multi-STIM<sup>®</sup>?

- Patent pending technology of an automated batch/continuous treatment skid which allows the monitoring and treatment of gas wells exhibiting liquid loading conditions
- Designed to meet all MMS, DNV and ATEX certifications for all hardware and software components
- Can be utilized in batch and/or continuous chemical/flush/monitoring applications
- Operates in conjunction with offshore and onshore ESD software and hardware safety processes
- Utilizes existing automatic flowline wing valves/inline chokes where possible for well "shut-in"/"re-open"
- Flowline spool equipment is also available where automatic wing valves/inline chokes do not exist
- Flexibility to utilize pneumatic or ATEX certified electric chemical injection pumps

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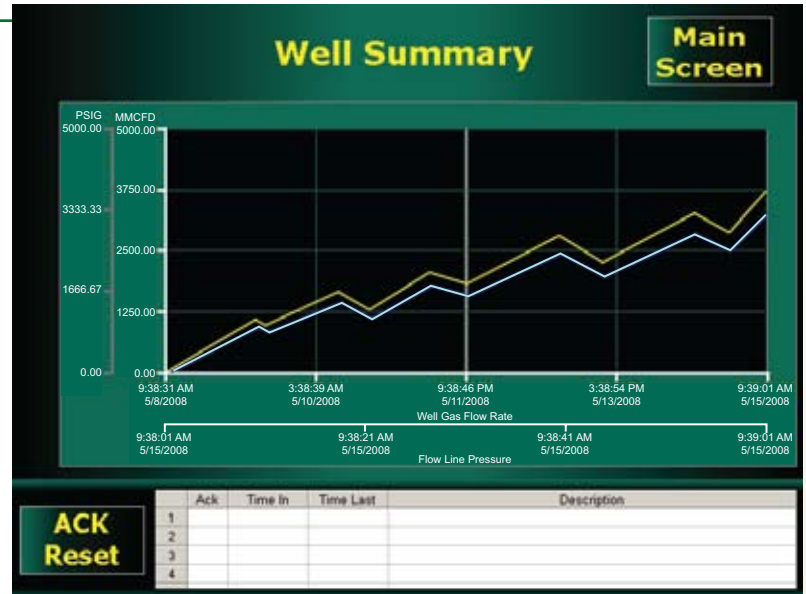
# multi-STIM<sup>®</sup> Enhanced Gas Recovery System

Case histories have proven that a large percentage of liquid loaded gas wells can yield extended periods of incremental gas flow from the application of liquid foaming agents via batch application. Batch application of a liquid foaming agent on a well that will sustain the increased level of gas flow for several days to weeks has in many cases proven to be a more economical and preferred method of application versus the cost of installing capillary injection equipment.

While batch application of a liquid foaming agent can in many cases be a viable alternative to the high cost of capillary injection equipment installation, other obstacles including mobilization of equipment and manpower to manned platforms, unmanned platforms and remote well locations remains an issue to overcome.

New technology is now available to the natural gas industry as an “automated approach to enhanced gas recovery” for wells exhibiting liquid loading conditions. This technology “multi-stim”, allows the batch and/or continuous application of liquid foaming and defoaming agents to affected wells by automatically monitoring the well flow pattern, thus initiating the batch application of a liquid foaming agent when a liquid loading condition is observed by the software monitoring program.

Additionally, remote monitoring of the skid allows the service provider and/or producer the capability of making changes to the treatment program and download system performance data onsite or from across the globe.



## HOW IT WORKS?

- Monitors the well flow pattern of gas, liquid, temperature and pressure
- Through pre-programmed trigger points, the software package recognizes a “liquid loading pattern” in the producing gas well and initiates a shut-in, liquid foaming agent batch application, dispersion down time and re-start of the well
- Software package automatically sends a signal to solenoid valves to switch from pre-wet to chemical and back to flush during each application
- Software package automatically initiates injection of liquid defoaming agent (where applicable)
- Software package monitors chemical and flush inventory
- Software package includes server memory backup and capability to pull production history and treatment results through multiple software programs i.e. excel, access, etc.
- Flexibility of monitoring both batch and continuous applications being performed from the same skid
- Capability to make changes to the treatment design and review skid/treatment performance from remote locations (operator to provide communication device, i.e. internet, satellite, etc.)
- Capability to operate skid in either manual or automatic mode