Premaberg Industrieanlagen Ges.m.b.H.

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Lowering Back Pressure, Optimizing Production and Reducing Costs With The Beam Gas Compressor™

The Beam Gas Compressor ™

by Permian Production Equipment, Inc.

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Lets Talk About

- How The Beam Gas Compressor™ Operates
- Areas of Operation and Time In Service
- Rod Pumping Problems
- Economics
- Applications
- Installation Examples
- Case Studies

How IT Works

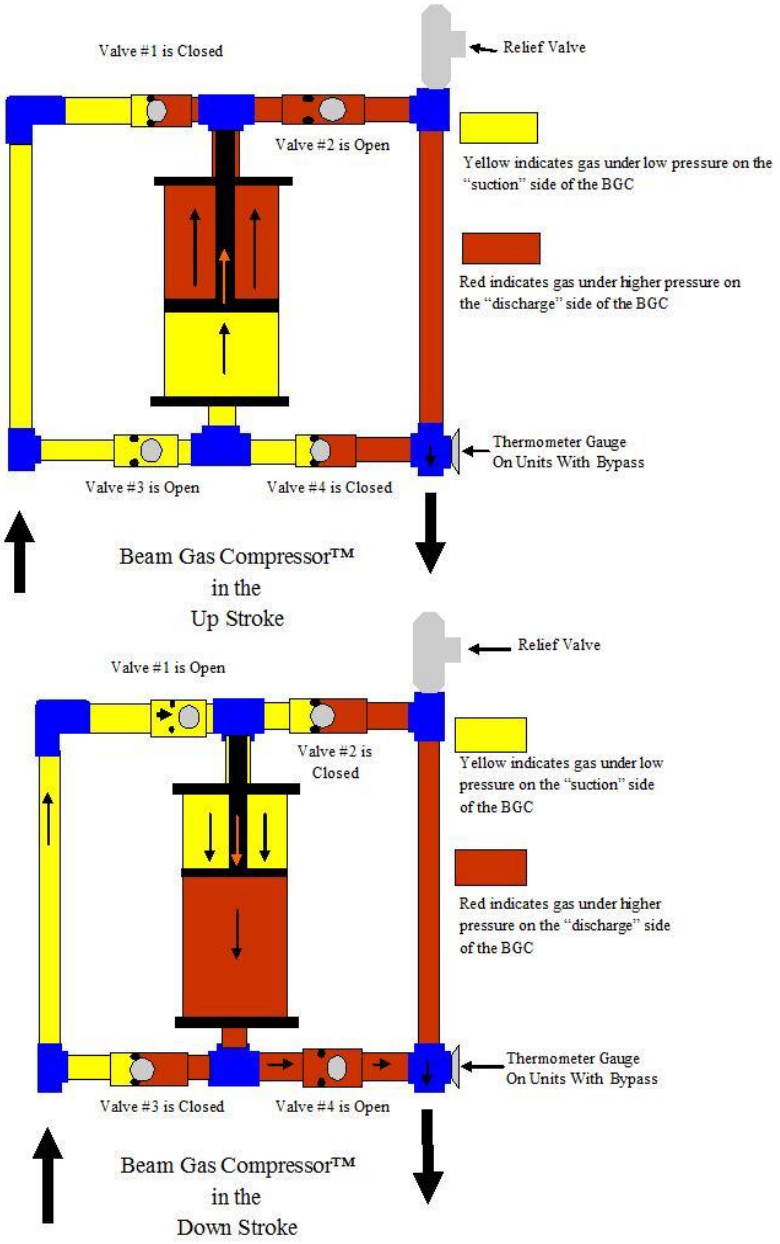
The Beam Gas Compressor™ uses the energy from the normal pumping action of the pump jack already on location.

The size of the BGC™ is configured to compress the daily gas production at the operator's desired casing pressure within the pumping unit's normal operating run time.

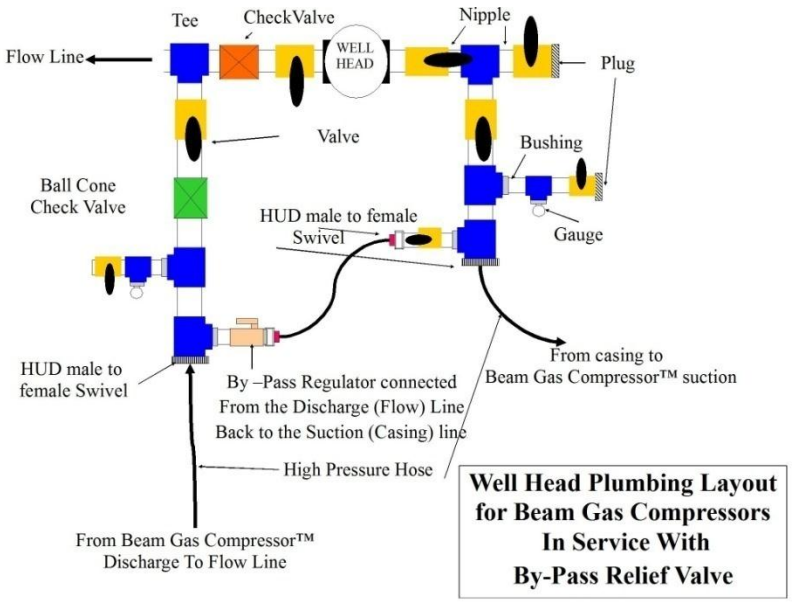
As the walking beam movement pumps the well, the Beam Gas Compressor™ draws produced gas from the casing through check valves and discharges it into the flow line down stream from the pumping tee. The gas rejoins the tubing production and flows to the separator and on to the gas sales line

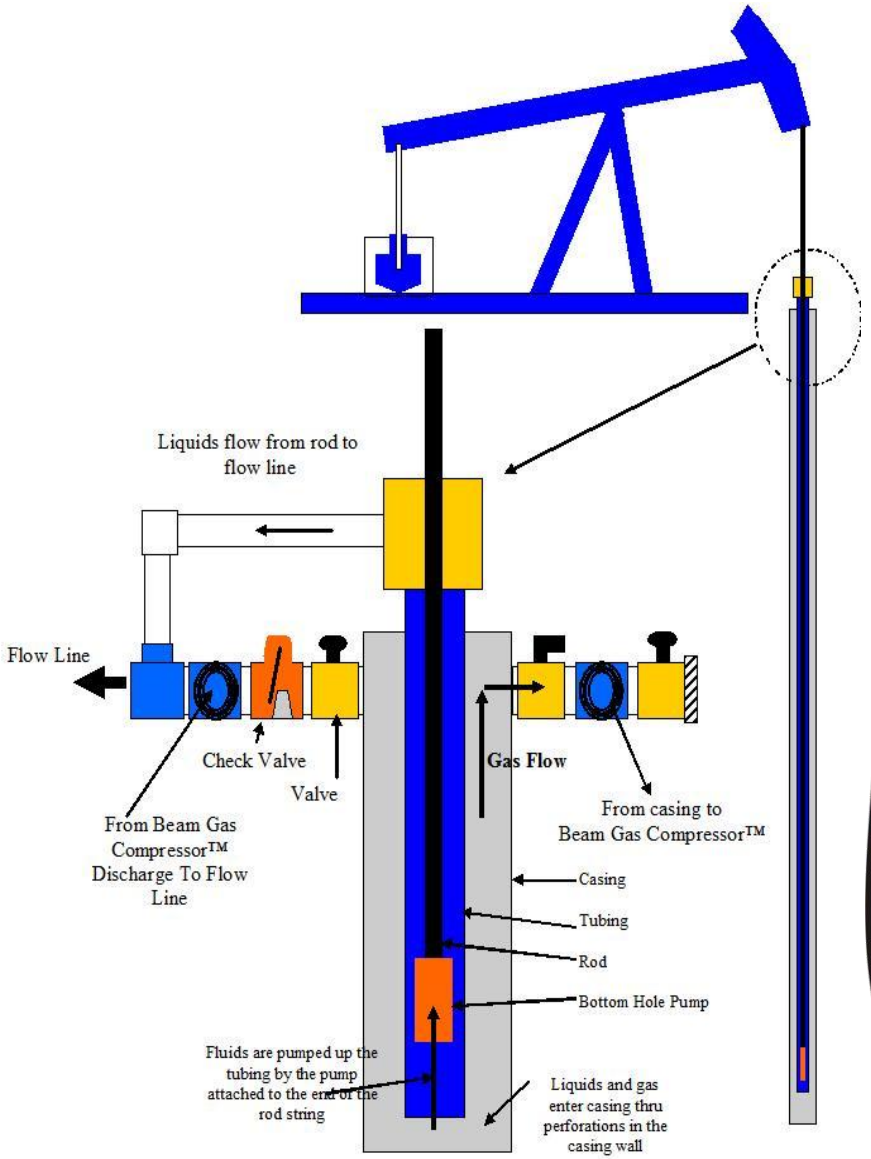
The BGC™ Is a double acting system and continually compresses gas in both directions providing-

"DYNAMIC Compression

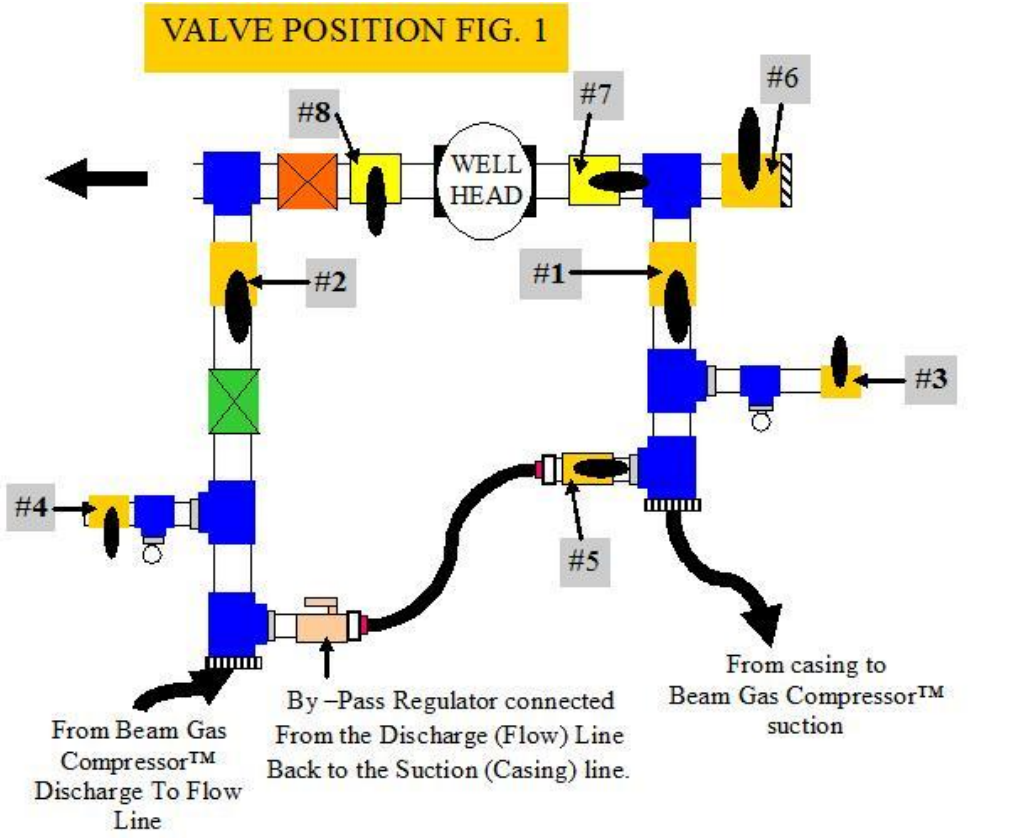


Relieves casing backpressure by drawing gas from the casing and compressing it into the flow line.





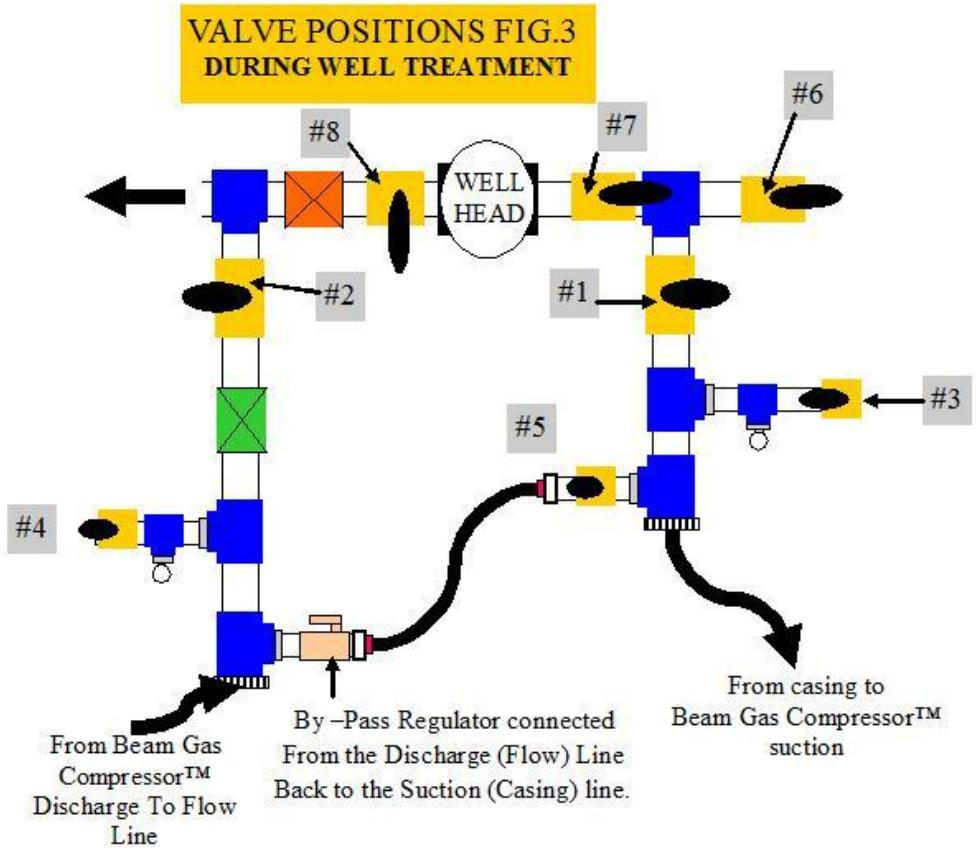
Well Head Plumbing
Normal Condition



DO NOT OPERATE VALVES WITH PUMPING UNIT RUNNING

COMPRESSOR IN SERVICE
VALVE #1 OPEN
VALVE #2 OPEN
VALVE #3 CLOSED
VALVE #4 CLOSED
VALVE #5 OPEN
VALVE #6 CLOSED
VALVE #7 OPEN
VALVE #8 CLOSED

Well Head Plumbing Compressor Out of Service, During Well Treatment



DO NOT OPERATE VALVES WITH PUMPING UNIT RUNNING

COMPRESSOR OUT OF SERVICE
VALVE #1 CLOSED
VALVE #2 CLOSED
VALVE #3 OPEN
VALVE #4 OPEN
VALVE #5 OPEN
VALVE #6 OPEN
VALVE #7 OPEN
VALVE #8 CLOSED

The BGC™ can be mounted on pumping units from 25 to 912

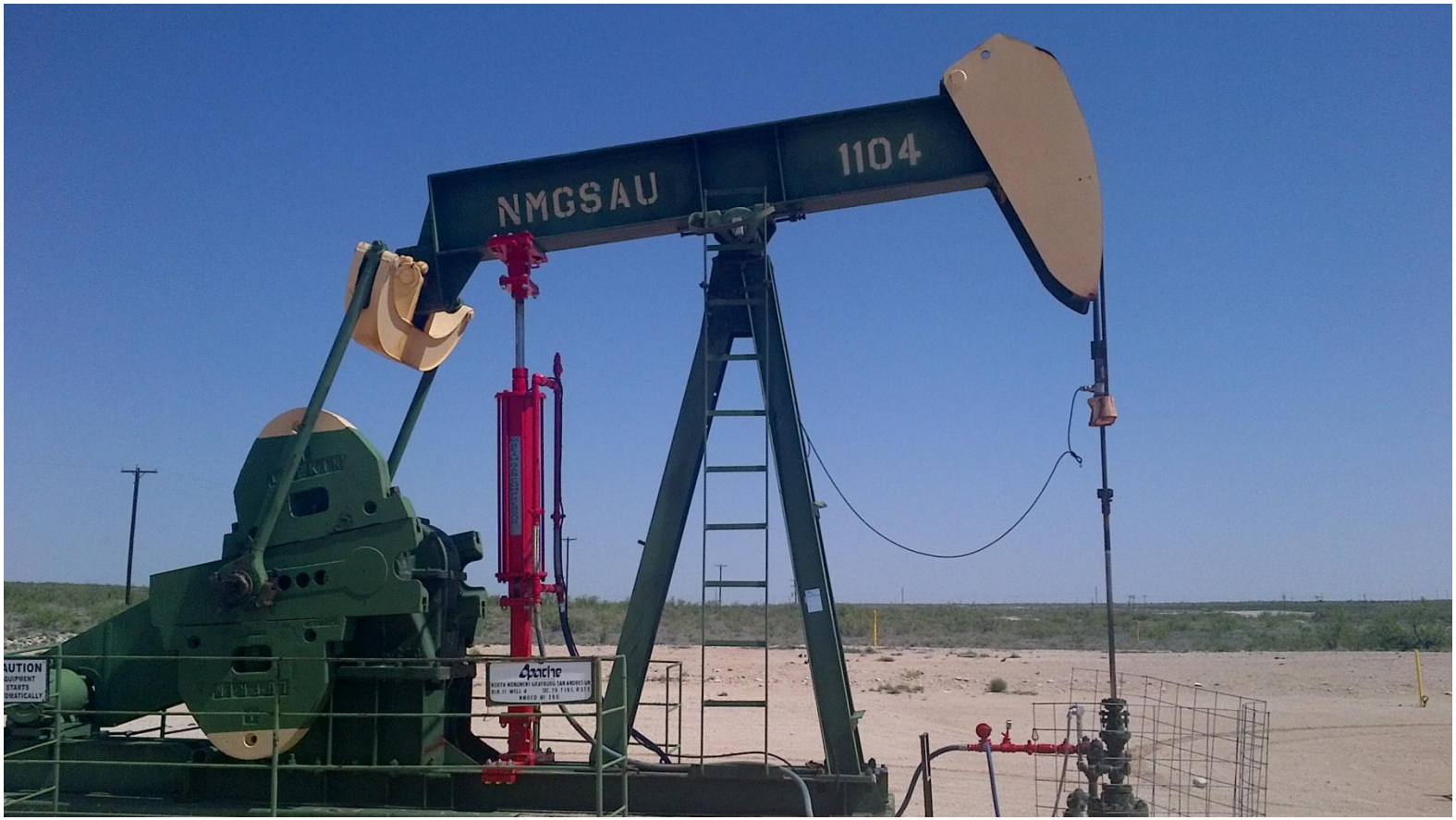
All are a factor of

Production, Pumping Unit Size & Settings and Casing/discharge pressure

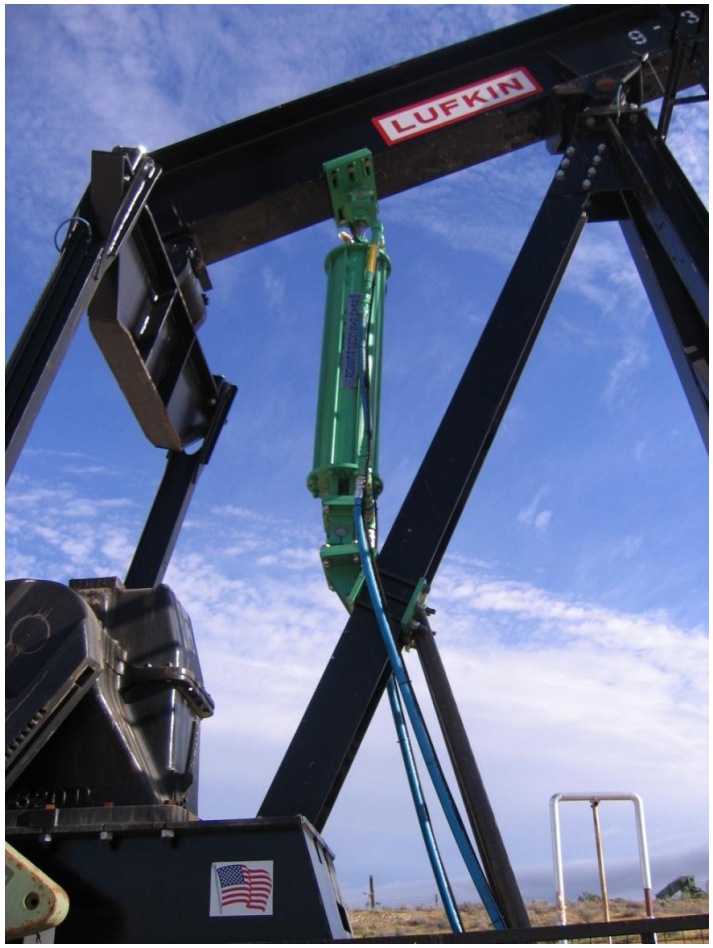
This is a conventional mount from the Walking Beam to the PU Skid.

Non Lubricated for easier Installation

Non Lubricated for easier Operation



The units are mounted via brackets to the
Walking beam and skid /sampson post
At no time is anything mounted permanently
To your pumping unit



Above is a BGC™ mounted to the
Sampson post

MAINTENANCE

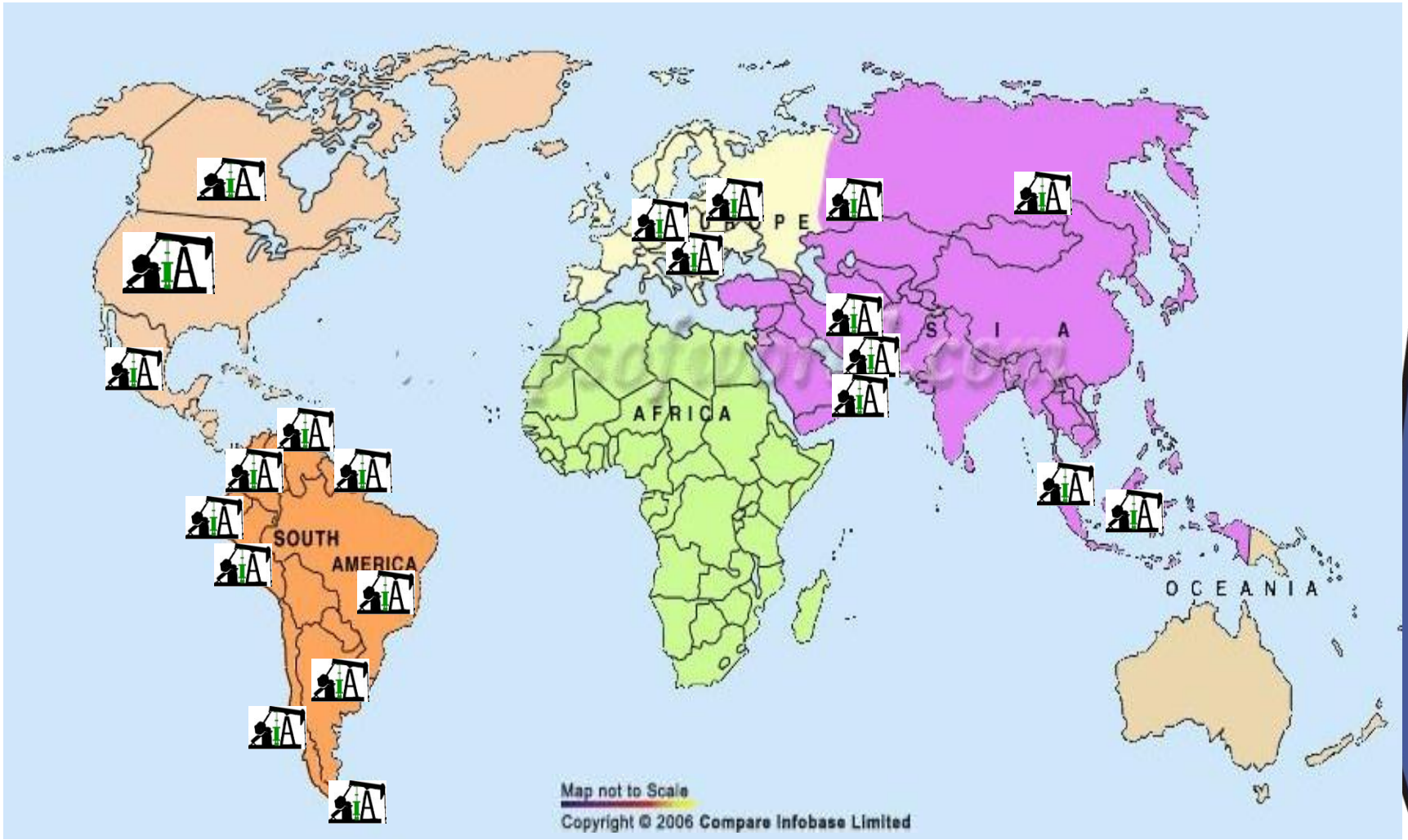
DAILY- Check Suction and Discharge Pressure Gauges against design specifications

WEEKLY- Check bolts and alignment of mounting brackets

MONTHLY- Check that all plumbing and pipe connections are secure. Verify Relief Pressure Valve is Operational at original settings.

WELL SERVICE: THE SUCTION LINE MUST BE PROTECTED FROM DIRT, SAND OR ANY OTHER MATTER WHEN THE WELL IS BEING SERVICED. ANY FOREIGN MATERIAL ALLOWED TO ENTER THE CYLINDER THROUGH THE SUCTION LINES WILL DAMAGE THE COMPRESSOR CYLINDER AND THE INTERNALS.

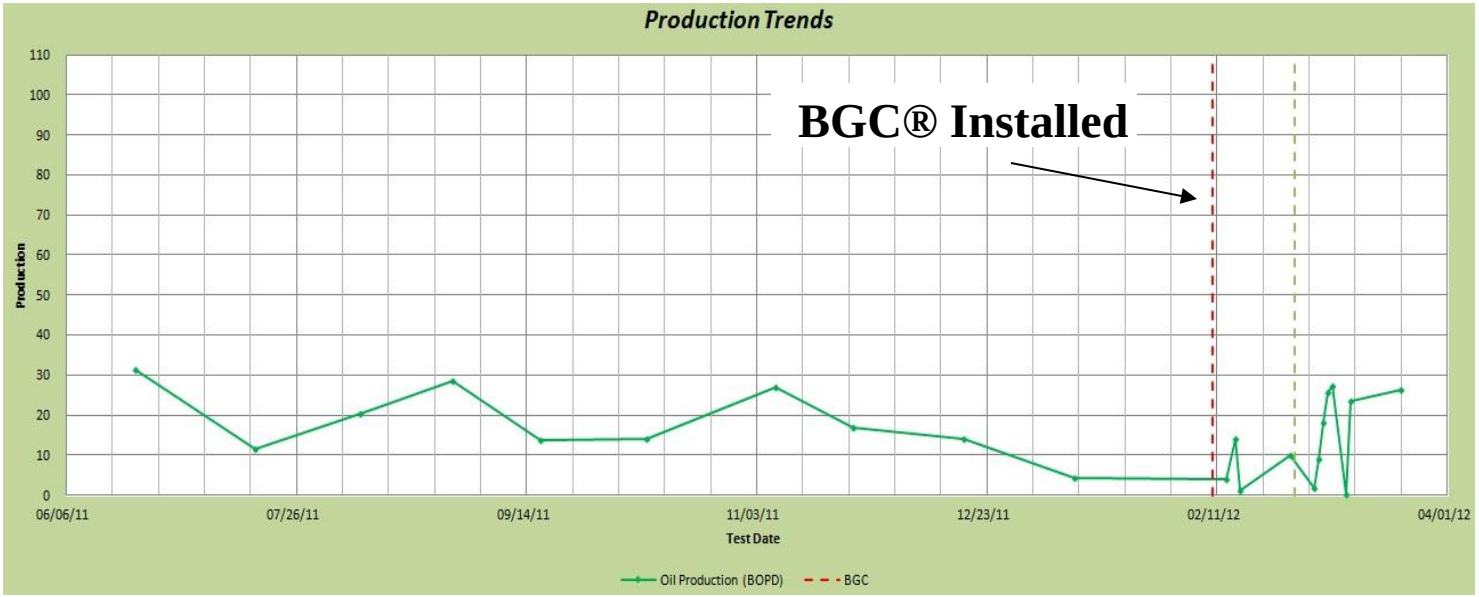
Over 30 years of Manufacturing and Installing BGC's in locations all over the world.



Rod Pumping Problems

- Reversing decline curve.
- To increase fluid flow to the well bore.
- Making a marginal well to become economical.
- Gas interference (gas lock) in the Down Hole Pump
- Compressing low pressure gas to the production facilities
- To reduce gas compression energy consumption
- To Reduce gas compression noise
- Reducing operational costs due to premature pump, rod or tubing failure

Reversing decline curve

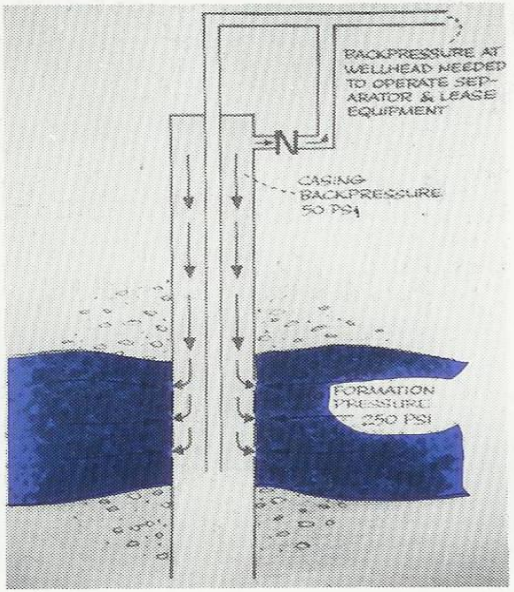


All producing Oil Wells have a Decline Curve. By using the Beam Gas Compressor™ at the point when bottom hole pressure (BHP) equals or comes close to surface pressure and "***old dog can be taught new tricks".*** Look at the graph above and you can see how a well that was thought to be ready for sale or plugging was revitalized and entered a second phase of production without a tremendous capital expenditure or tertiary method of recovery

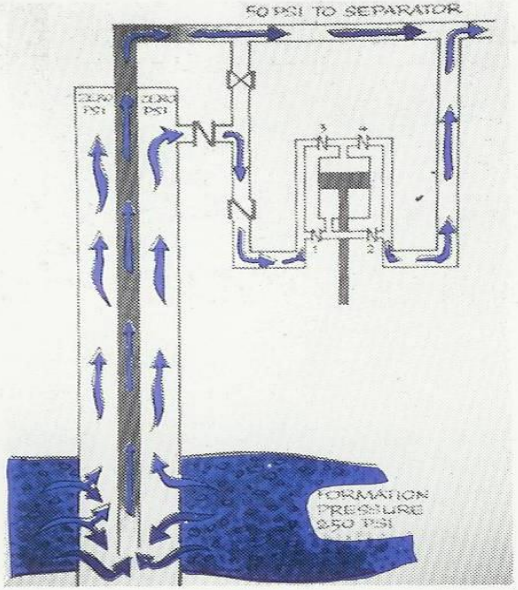
To increase fluid flow to the well bore

Before the BGC

Restricting Back pressure holds back the flow of Hydrocarbons into the well bore.



After the BGC

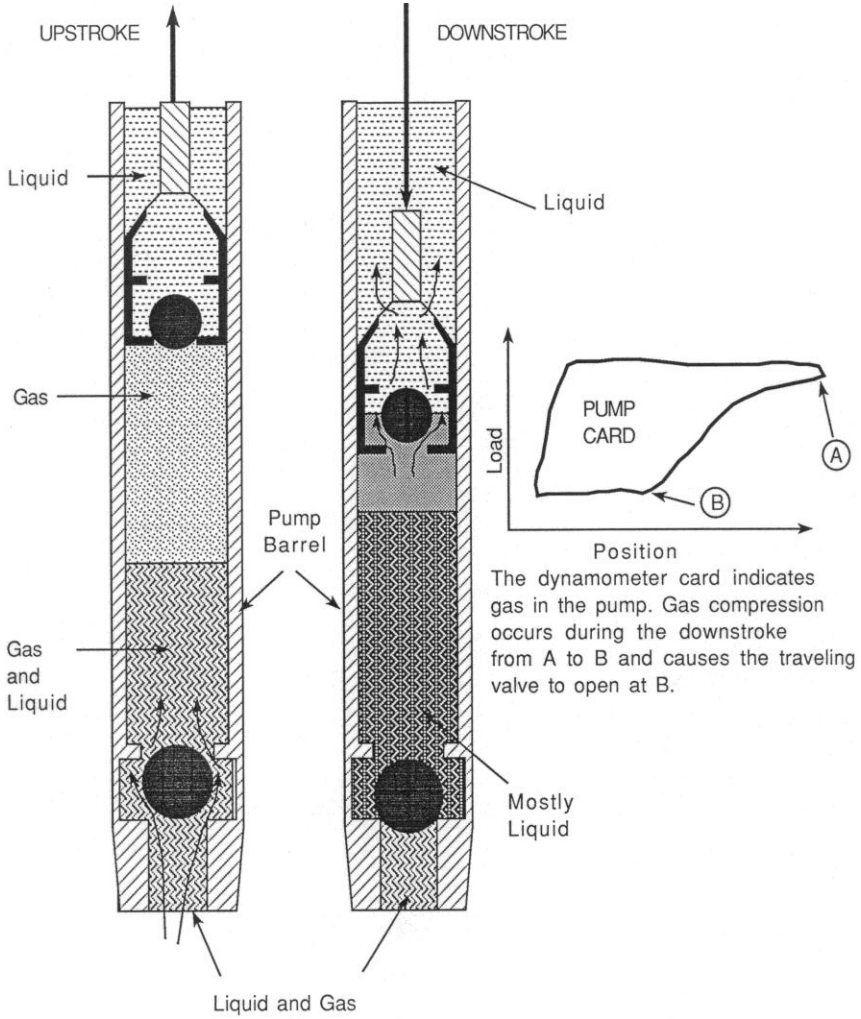


Back pressure is relieved from the face of the formation allowing more hydrocarbons to flow into the well bore.

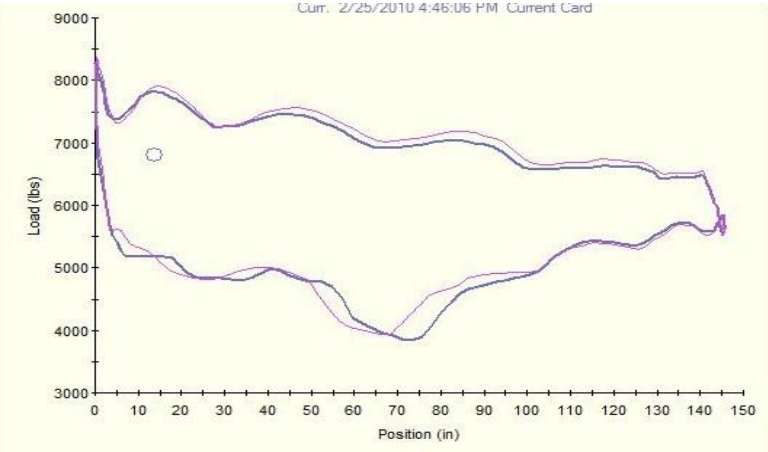
Making a marginal well to become economical

Before Back Pressure Reduced		After	$ Increased Revenue
STROKES PER MINUTE.....:	6.77	6.89	
TIME CYCLE IN % (.00).....:	84%	85%	
SUCTION PRESSURE GAUGE.....:	100	0	
DISCHARGE PRESSURE GAUGE.....:	100	100	
OIL PRODUCTION - BPD	3	8	$151,300 Yearly
GAS PRODUCTION - MCFD	12	18	$9,115 Yearly

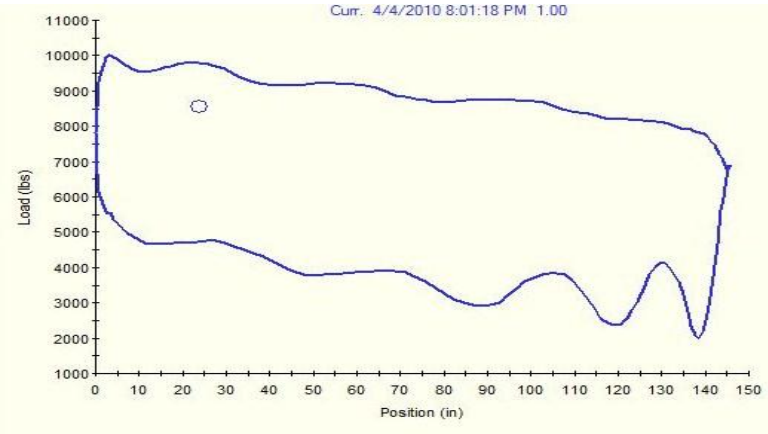
Gas interference (gas lock) in the Down Hole Pump



Above picture courtesy of Ecometer and Lynn Rowland.



Card Above is Before BGC™ installed
Card Below is After BGC™ installed
Installation Bakersfield, California



Compressing low pressure gas to the production facilities

Low bottom hole pressure wells have a problem to move the gas into higher pressure production lines and facilities because of this gas pressure builds up in the casing restricting flow of fluids to the well bore

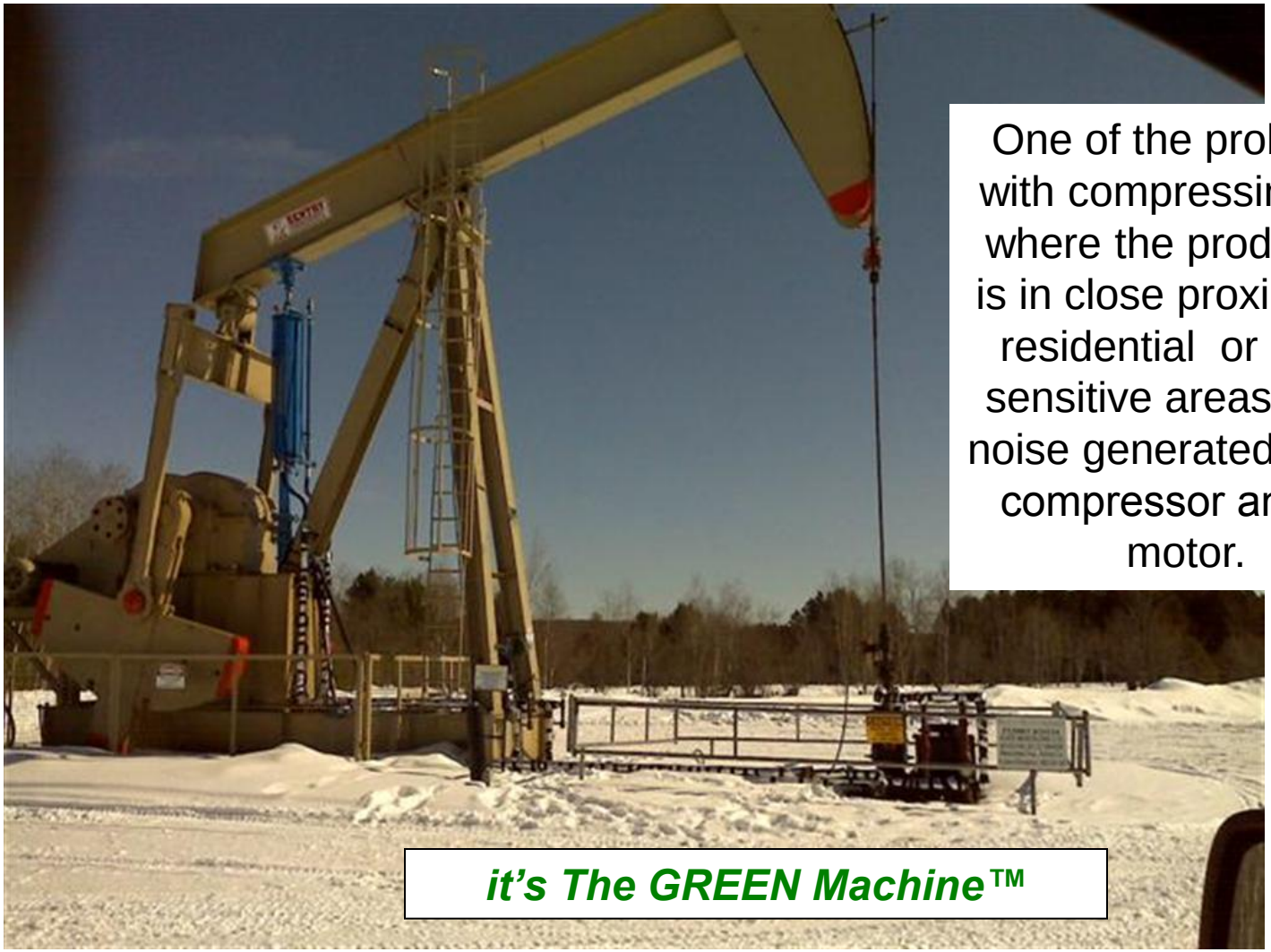
it's The GREEN Machine™

To reduce gas compression energy consumption

This location had been renting a skid mounted natural gas engine driven compressor by releasing it and purchasing a “Beam Operated Compressor” the operator reduced costs by
$4,500 per month ($3,000 per month rent/ 20mcfd gas consumption) or
$54,000 per year

it’s The GREEN Machine™

To reduce gas compression noise



One of the problems with compressing gas where the production is in close proximity to residential or noise sensitive areas is the noise generated by the compressor and it's motor.

it's The GREEN Machine™

Reducing operational costs due to premature pump, rod or tubing failure

Work over repairs to Down Hole Pumps, the Rod String, and Tubing failure due to fluid pounding and rod buckling increases operating expenses of the well. Lost production during this work-over also results in the loss of revenue.

Economics

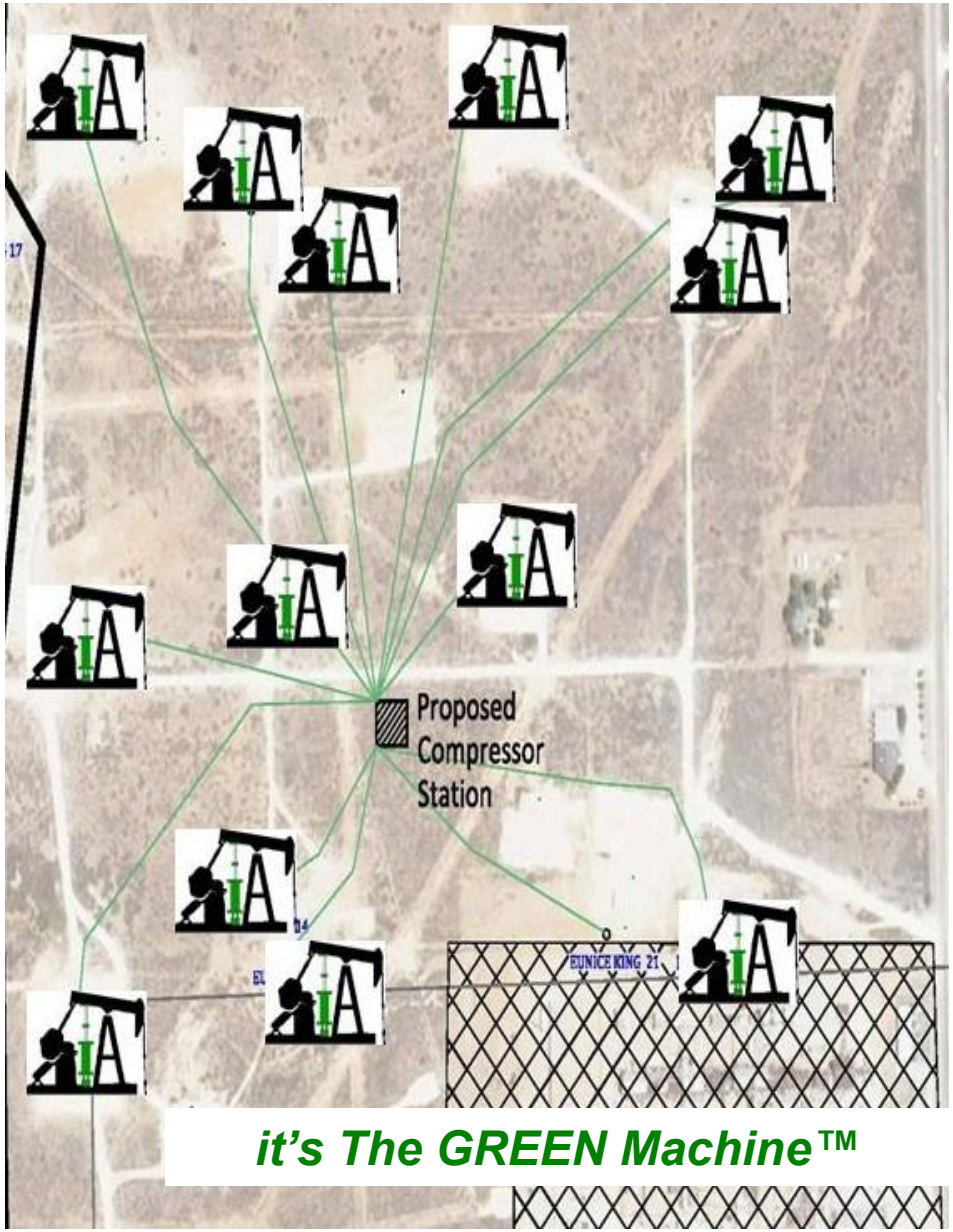
Multiple BGC's™ vs Field Compression

In this example a field compressor would cost over $565,000 and 12 months to install, trench, lay new flowlines and permit

Installing multiple BGCs™ cost of $300,000

No Permits
No Trenching
No new flowlines
Greater Compression at each well head
Maintenance

The Operator predicts an additional $500,000 in production Just waiting on the permits BGC ™ generates additional $5 mill revenues



it's The GREEN Machine™

Additional Applications

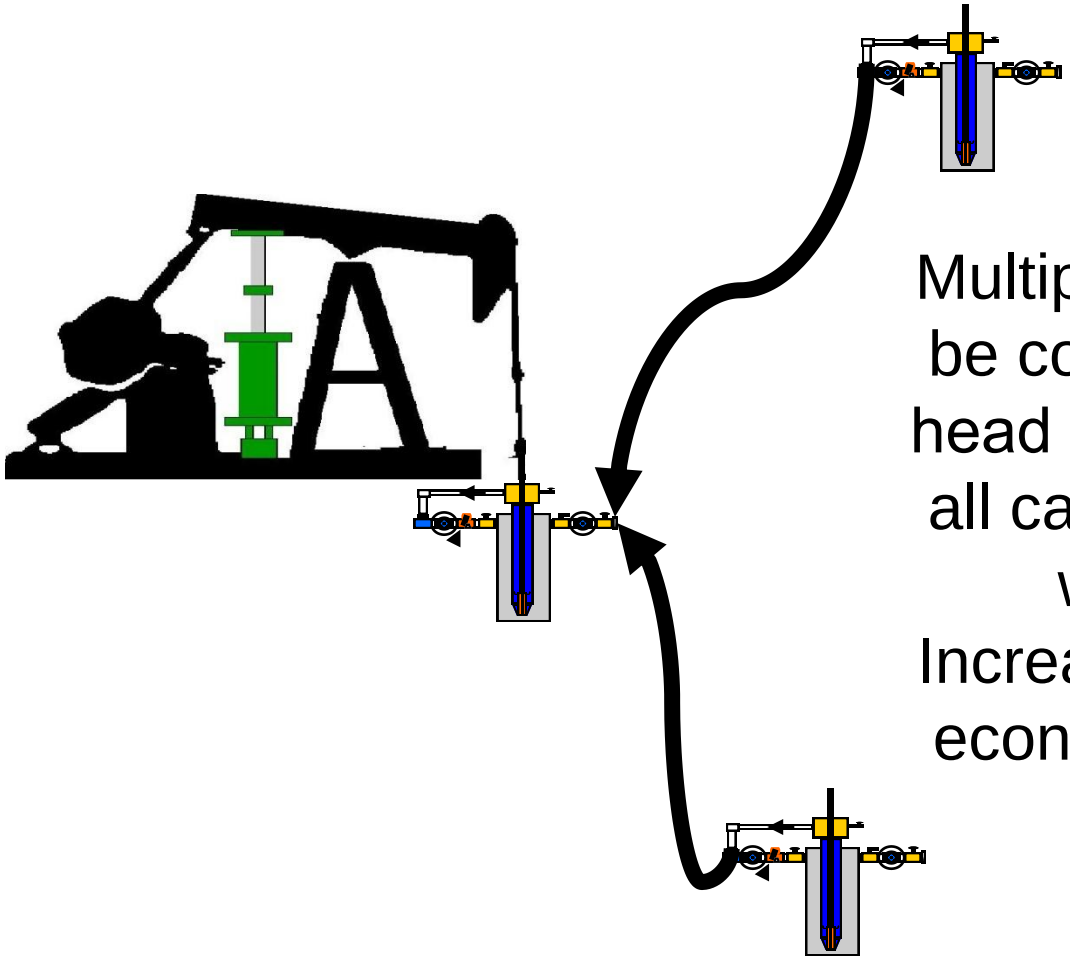
For remote locations where dependable gas compression is required and the only other kind of wellhead compression is extremely expensive.

Using Two BGCs™ on one Pumping Unit:

-operated in parallel for high volumes

-two stages for high line pressure

Using BGC as a low cost gathering system



Multiple well heads can be connected to a well head with a BGC™ and all can be compresses with one unit. Increasing the ROI and economics even more

Data Sheets
The basis behind the design of a BGC

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BEAM GAS COMPRESSOR™ WELL DATA SHEET

COMPANY INFORMATION

Revised 06-27-10

1	COMPANY		PHONE			
2	ADDRESS		FAX#			
3	CITY		STATE		ZIP	
4	PROJECT MANAGER		CELL#			
5	EMAIL ADDRESS					
6	LEASE OPERATOR		CELL #			
7	OTHER NAME		PHONE#			
8	EMAIL ADDRESS					

WELL INFORMATION

9	WELL NAME				TOWN LOCATION					
10	GPS DATA	LONGITUDE			LATITUDE					
11	PRODUCTION	OIL		WATER		TOTAL FLUID				
12	GAS SALES MCFD		FUEL GAS		HEATER GAS		TOTAL GAS EXPECTED			
13	PRESENT CASING PRESSURE				DESIRED CASING PRESSURE					
14	BGC DISCHARGE (FLOWLINE) PRESSURE (PSIG)				GAS IS:	SWEET		SOUR		
15	PERFORATION DEPTH		PUMP DEPTH			PUMP SIZE				
16	PRODUCING FORMATION				PRODUCTION INDEX (PI)					

PUMPING UNIT INFORMATION

17	MAKE		MODEL SIZE		TIME CYCLE (% OF 24 HOURS)					
18	STYLE	CONVENTIONAL		MARK		AIR BALANCE				
19	POLISH ROD STROKE LENGTH		LONG		MED		SHORT			
20	PRIME MOVER HP		GAS		ELECTRIC		STROKE			

CHECK THE TYPE OF PUMPING UNIT BELOW

____- Skid Mount

___- Post Mount

___- Mark Rear Mount

___- Mark Front Mount

_____- Front Extension Mount

DIRECTIONS TO WELL AND NOTES			
DATA GIVEN BY		DATE	

Fill in all Blank Areas Attach PHOTOS of Pumping Unit

Conventional BGC Installation

Front Mount BGC Installation

Mark II BGC Installation

Air Balance BGC Installation

OPERATOR COMMENTS & CASE STUDIES

- The following cases were based on several of the wells in the Indian Basin region of New Mexico
- Pay out is based on Oil = $ 90.00 and Gas = $ 4.00. Current pricing may be different but the percentage increases are typical

- In the Indian Basin, New Mexico, most of the wells were in the later stages of productivity curves and the operating company was looking for technologies that would maximize the life and production of their wells.
- A **Beam Gas Compression System (BGC)** was chosen to do just that. Each unit was designed for the well based upon several factors, such as, Pumping Unit Specifications
  Down Hole Specifications
  Flow line Pressure (BGC discharge)
- The project had fifteen units installed in 2003 and are still in use today
- The Units were installed without any concern or stress carried to the Pumping Unit which greatly pleased the operating company
- The following are specific cases that had some or all of the problems associated with Rod Pumping Wells- Back Pressure, Gas Interference in the DHP.

In these case studies, we have their production before and after installation of the beam gas compression systems.

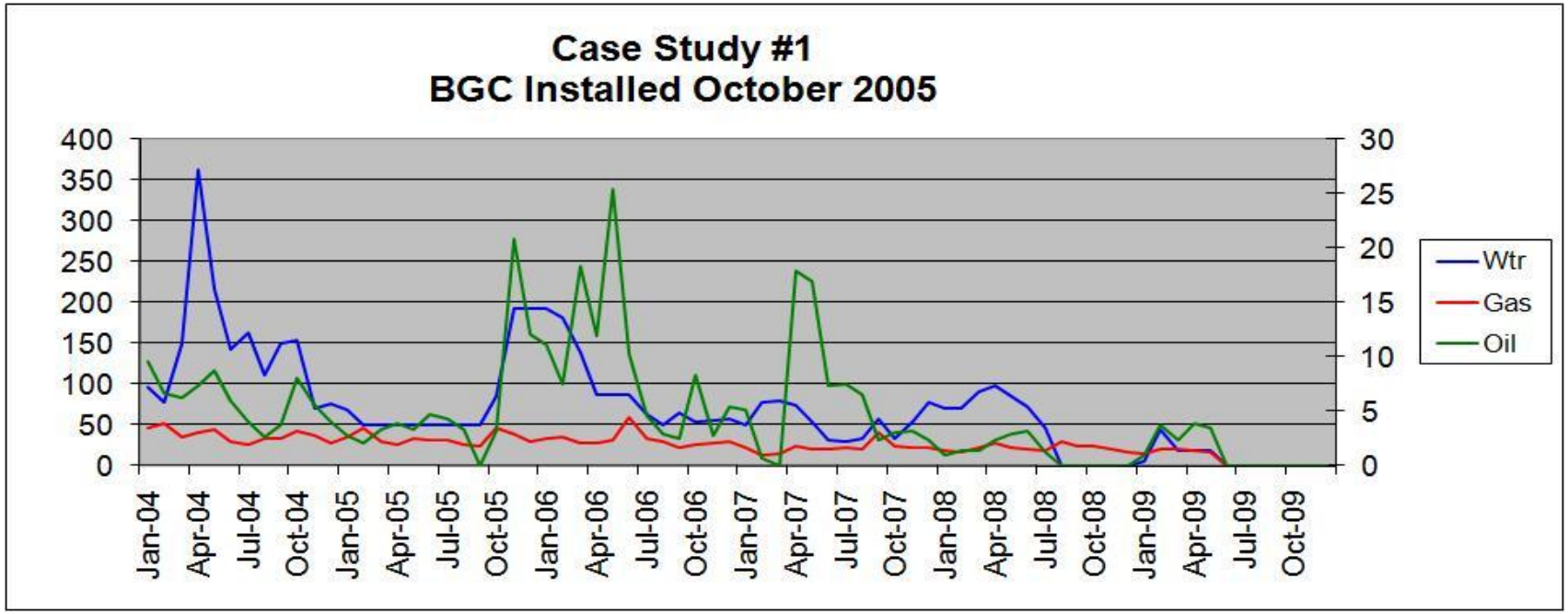
CASE Study #1

	Parameter	**Before BGC**	**After BGC**	**Increase**	**Increase in Nine Months Revenue**
Indian Basin	Casing PSIG		0		
New Mexico	Oil, BPD	3.5	13.4	9.90	$ 320.760,00
	Gas, MCFD	32.3	37.7	5.4	$ 7.776,00
				Total Yearly Increase	**$ 328.536,00**

CASE Study #1

- **BOPD Increase 9.9**
- **MCFD Increase 5.4**
- **Annual $ Increase Revenue**

+ $ 328.536,00

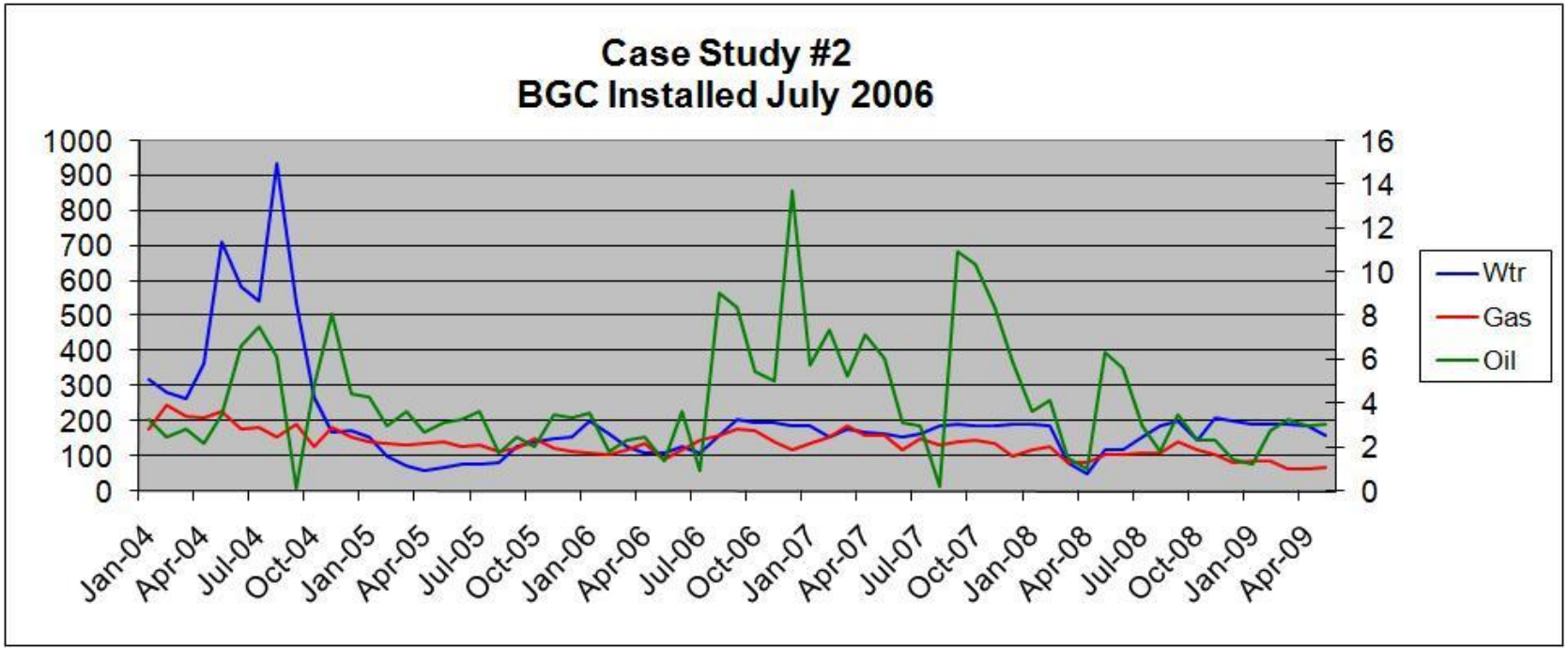


CASE Study #2

Indian Basin	Parameter	Before BGC	After BGC	Increase	Increase in Annual Revenue
	Casing PSIG	40	0		
NM	Oil, BPD	2.5	8.6	6.1	$ 197.640,00
	Gas, MCFD	122	153	31	$ 44,640.00
				Total Annual Increase	**$ 242.280,00**

CASE Study #2

- **BOPD Increase 6.1**
- **MCFD Increase 31**
- **Annual $ Increase Revenue $ 242.280,00**



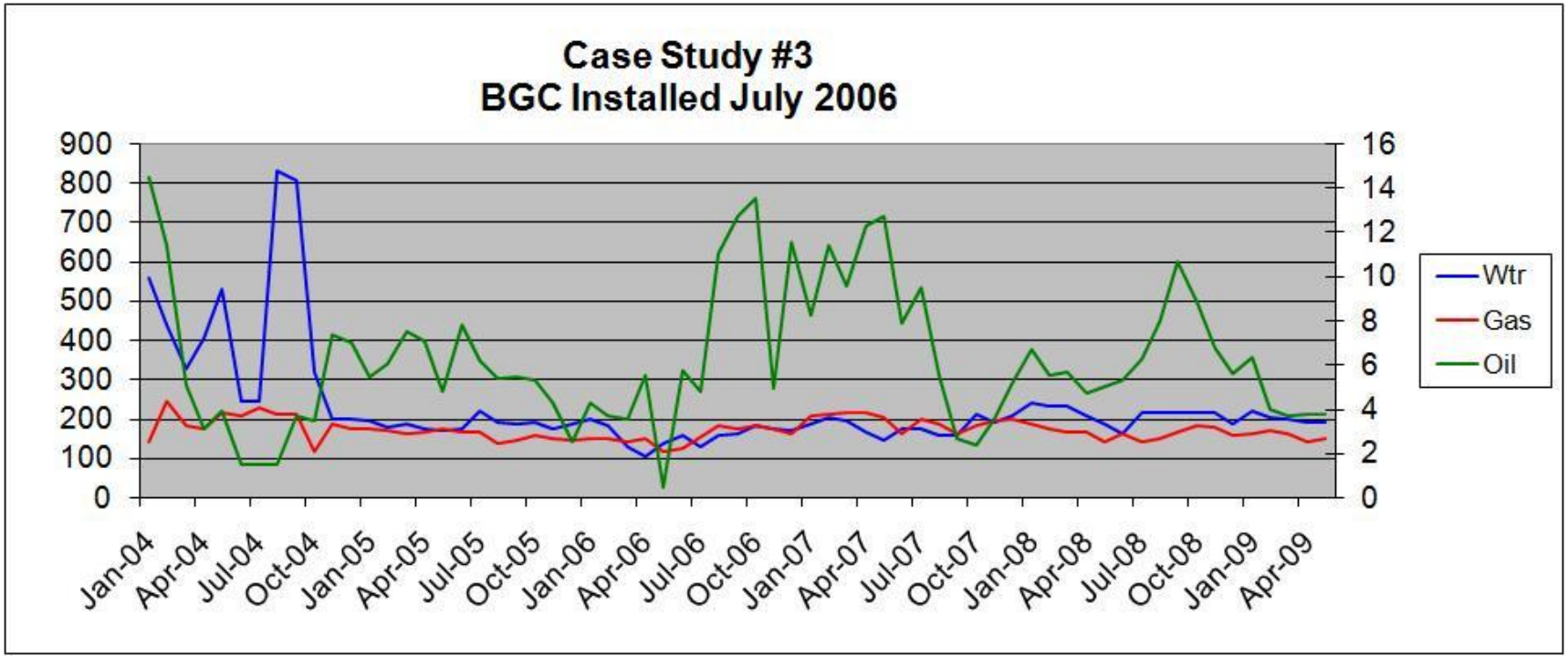
CASE Study #3

Indian Basin	Parameter	Before BGC	After BGC	Increase	Increase in Annual Revenue
	Casing PSIG	40	2		
NM	Oil, BPD	5	12	7	$ 226.800,00
	Gas, MCFD	165	215	50	$ 72,000.00
				Total Annual Increase	**$ 298.800,00**

CASE Study #3

- **BOPD Increase 7**
- **MCFD Increase 50**
- **Annual $ Increase**

Revenue $ 298.800,00



In conclusion:

By utilizing the energy derived from the Pumping Unit to operate the BGC™ to compress casing head gas you can save on the energy cost of compression.

The BGC™ joins with the reliable pumping unit as its prime mover. By utilizing the reliable Pumping Unit as the BGC's™ prime mover operators enjoy a steady increase in production with a reliable compression system that is considered THE GREEN MACHINE™ by the industry.

By combining a BGC™ with the Beam Pump system you can increase the performance of the pumping system and solve many of the problems associated with rod pumping systems.

a member of the heat-group

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