



SJBU - Completions

## Gas Recovery Cleanout System

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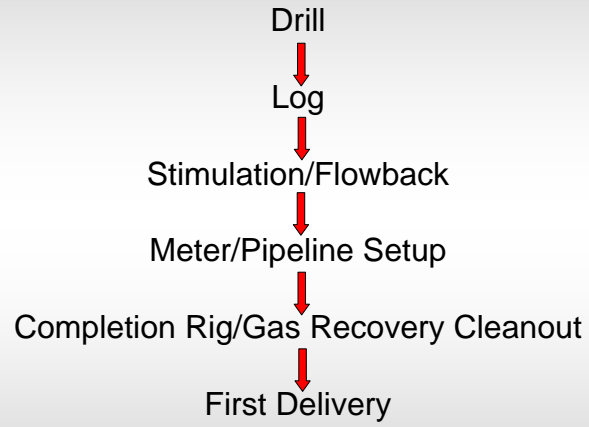
## Gas Recovery Cleanout Process

What is it?

- A process for utilizing pipeline gas as the carrying fluid during the cleanout phase of a new well completion.
- Gas returns from the well are not vented or flared to the atmosphere, but are sold directly into the pipeline.

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## Completion Process



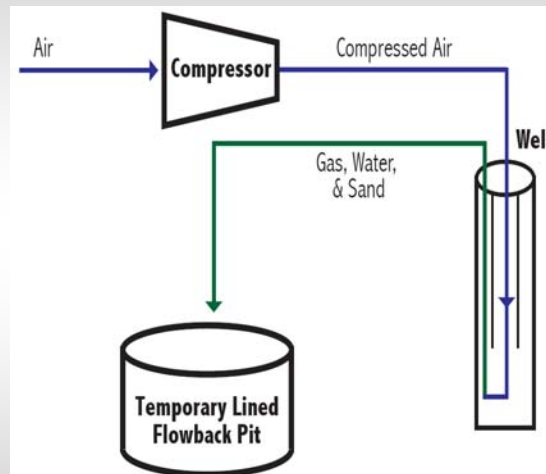
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## Conventional Cleanout Process

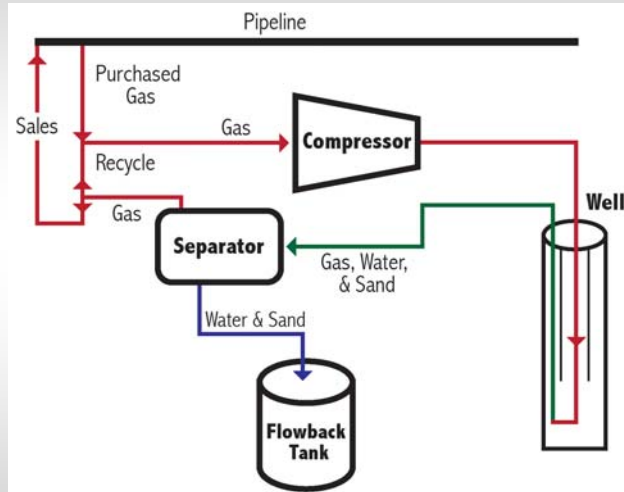


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## Gas Recovery Cleanout Process



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## Weatherford Package



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## Weatherford Package



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## Gas Recovery Cleanout Process

### Benefits:

- Less than 10ppm O<sub>2</sub> concentration
- Reduce risk of down hole fire
- Recovers and monetizes gas that would otherwise be vented

### Disadvantages:

- Increased Cost (~\$4,000/day)
- More equipment on location
- Combustible gas in surface piping

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## Gas Recovery Cleanout Process

### Phase 1: FTC Completions in Colorado

- Eight wells frac'd with a x-linked gel, eliminating N<sub>2</sub> issues
- All wells were connected to a COP operated gathering system
- **Net Sales = 16.068 MMCF** (~2.0 MMCF/well)

### Phase 2: DK Standalone Completions in New Mexico

- Ten wells frac'd with slickwater, eliminating N<sub>2</sub> issues
- Connected to third party gathering systems
- Proved that 10ppm O<sub>2</sub> specs could be met
- **Net Sales = 60.222 MMCF** (~6.0 MMCF/well)

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## Gas Recovery Cleanout Process

### Phase 3: MV/DK, DK Standalone, & FTC Completions

- 100+ wells
- Incorporated wells completed with N<sub>2</sub> energized frac's

#### Results:

- MV/DK discovered to be the most profitable formation for the gas recovery cleanout system (~14.5 MMCF/well)
- Developed a process to get the N<sub>2</sub>% down for the pipelines

**Net Sales = +1.2 BCF** (~14.5 MMCF/well), as of 3/2010

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## Gas Recovery Cleanout Process

Rigs utilizing gas recovery cleanout:

- Drake #24 – Johnny Knight/ JD Griffith (2007)
- Drake #26 – Andy Jackson/ JD Griffith (Nov. 2008)
- Aztec #378 – Ronnie Rivera/ Vic Montoya (May 2009)
- Aztec #448 – Vic Montoya/ Wayne Shenefield (Dec. 2009)

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## Steps Forward

- Continue letting the pipeline companies know when we are using a gas recovery cleanout many wells in advance.
- Apply for amendments in rules and regulations regarding royalties and date of first delivery.
- Integrate new gas recovery cleanout packages as they become available with Weatherford, as well as other vendors.
- Purchase Williams designed metering skids for District Tools.

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## Williams Metering Skid



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## Williams Metering Skid



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## Williams Metering Skid



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## Questions



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