Green Flowback Process

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Background

In the early days, oil was the primary saleable commodity.

The associated gas was vented or flared to the atmosphere.

Methane Emissions

- The venting of methane is 23 times more damaging than the CO_2 produced by burning the natural gas.
- Special approval is needed from MMS for venting or flaring for offshore operations
- An operator’s policy states that the corporation "will conduct its operations in a manner that respects the natural environment."

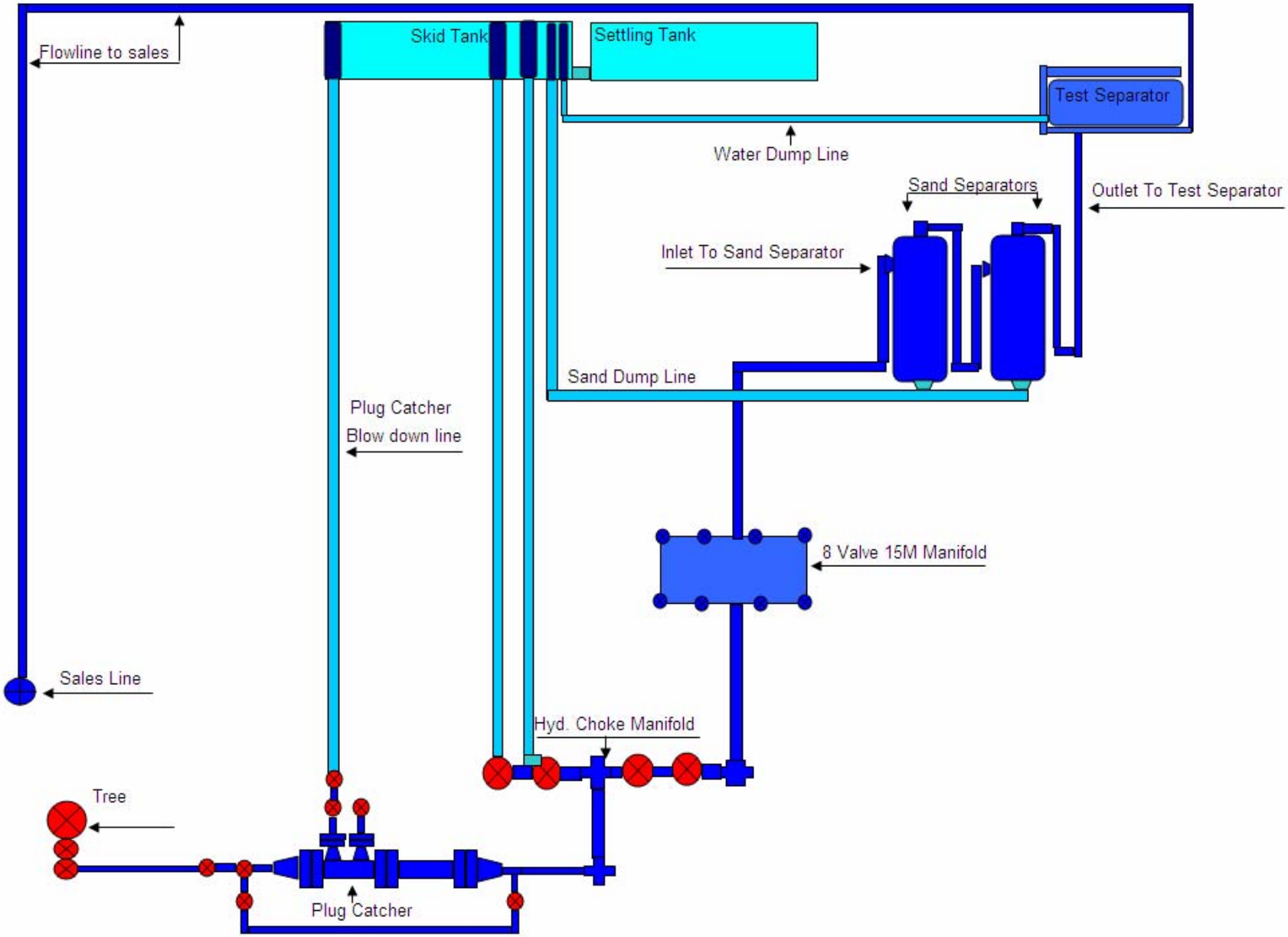
Green Flowback Process

The Green Flowback Process is a well completion system that maximizes the recovery of saleable hydrocarbons during the completion phase of a drilling operation.

How it works

- Temporary staged frac plugs are drilled via coiled tubing, snubbing or workover rig.
- Produced fluids and plug cuttings enter flowback system.
- Large solids are captured and removed from fluids.
- Produced fluids enter manifold and separator system for rate and pressure control.
- Sand particles are then captured and removed from produced fluids.
- Hydrocarbons are separated and directed to sales line.
- Hydrocarbons are sold during entire drilling process.

Green Completion Drillout Process
Rig Up



Benefits

- Recognized by Gas Star Program
  - No Flaring – No Venting
  - Reduced Methane Emissions
  - Environmentally Friendly

- Able to sell Hydrocarbons during completion drillouts
  - Capture and remove large produced solids
  - Capture and record produced hydrocarbons
  - Comprehensive well testing to predict well and field productivity

Benefits

- Eliminates well shut-in time
  - Reduces debris fallback on top of BHA
  - Reduces plugging of hydraulic manifold
  - Reduces differential sticking of BHA

- Minimal or no formation damage
  - Eliminate loading hole with kill fluid

Gas STAR Partner Experience

- Upper zone flowed for two years.
  - Upper zone BHP now at 4,200 psi.
- Lower zone below a composite bride plug.
  - Lower zone BHP at 11,500 psi.

- ***How could they safely and efficiently remove the bridge plug?***

IPS Solution

- Analyzed well conditions and determined snubbing unit was the appropriate solution to drill out bridge plug.

- Incorporated Green Flowback Process to sell gas while tripping pipe and drilling bridge plug.

IPS Solution

- Tripping – gas produced 2mmscf/day.
- Drilling – gas produced at 5 mmscf/day.

Customer Value

- Well was not shut in or loaded with fluids.
- No formation damage.
- Sold gas through entire process.
- 23 mmscf sold – not flared or vented.

Natural Gas Star partners currently using this completion method

QUESTAR

Over 99 completions

devon

Over 60 completions

Over 20 completions

Over 20 completions

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