Anadarko Petroleum Corporation

Anadarko Vernal, UT Operations

- APC Operates 1600 Wells in the Uinta Basin and Produces 380 MMCFD of Clean Burning Natural Gas that can Heat over 2.8 Million Homes
- APC Currently has over 190 Employees and 600 Plus Contractors in the Uinta Basin
- APC Provided over 130 Million Dollars in Revenue to the Federal, State, and Local Governments in 2009

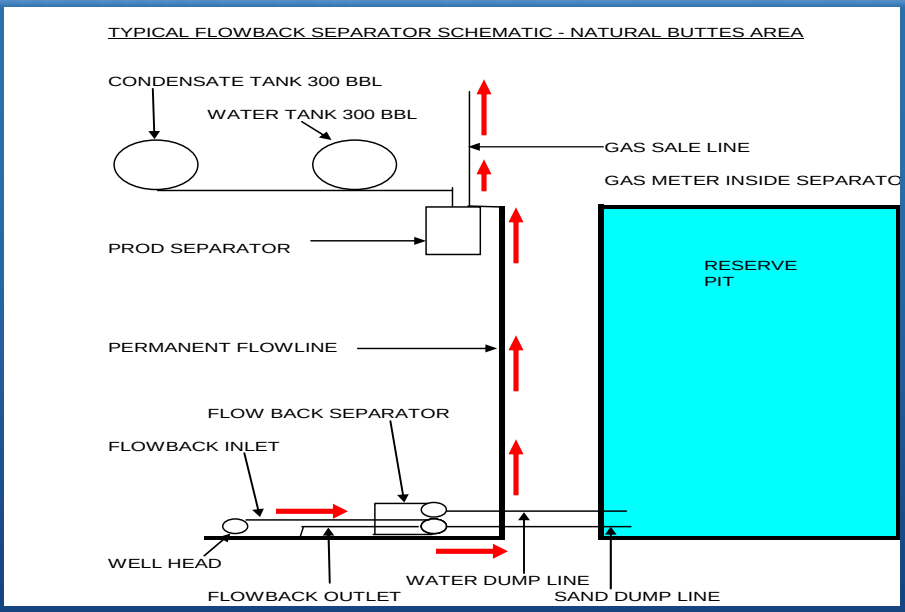
Anadarko Vernal, UT Operations

- Anadarko is Actively Executing Methane Emission Elimination and Reduction Strategies in the Greater Natural Buttes
- Current Emission Reduction Initiatives
  - Reduced Emission Completions
  - Sandpiper Pump Modification
  - Solar Circulation Pumps

Reduced Emission Completions

- APC field personnel designed to fit characteristics of Uinta Basin flowbacks
- All Flowback Material is Flowed Through the HAL9000 Unit Following the Well Stimulation Treatment
- The 2-Stage Unit Separates Solids and Fluids
- 1st Stage Captures Residual Sand Volumes from Flow Stream
- 2nd Stage Separates Liquid and Gas
- Gas Volumes are then Metered and Flowed to Sales

Reduced Emission Completions



Reduced Emission Completions

HAL9000 Gas Separator Unit

2-Phase Separation Bottle

Sand Separation Bottle

Inspection Port

Dump to Pit

GNB Completion CH_4 Emission Savings

Year	Wells Completed HAL9000	Historical Flowback Time	** Estimated Gas Captured	Estimated Methane Captured
		Days	MMSCF	X10³ TONS
2005	8	5	65	1.4
2006	179	5	1454	31.4
2007	168	5	1365	29.5
2008	288	5	2340	50.6
2009	191	5	1552	33.5
2010	*250	5	2031	43.9
Total	**847**	**5**	**8807**	**146.4**

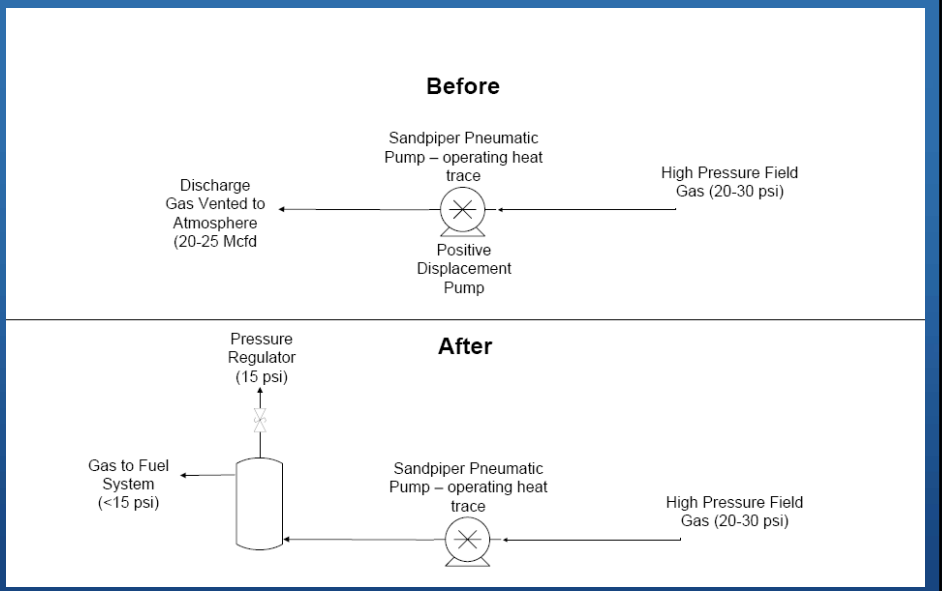
* 2010 Estimated Completions

** Based on Average Daily Gas Flowrate of 1625 Mcfd

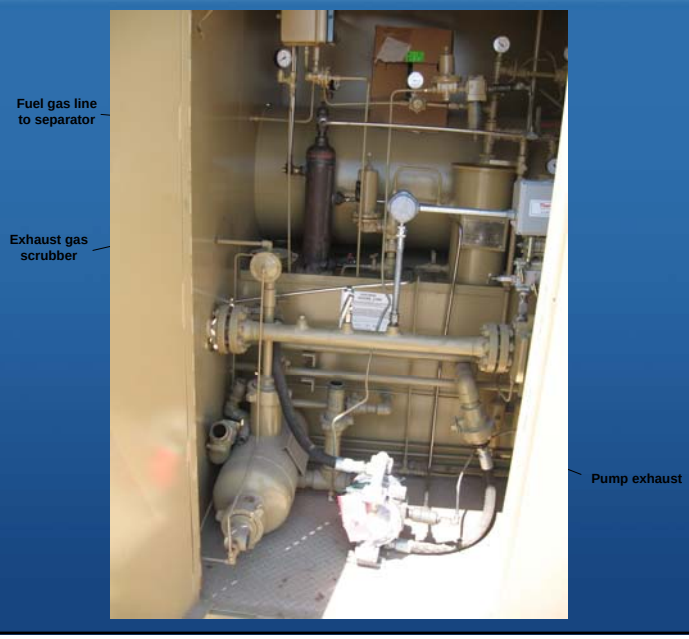
Sandpiper Pump Modification

- **Sandpiper Pump used to Circulate Glycol to Prevent Freezing**
  - Routes Sandpiper Pumps exhaust gas (CH_4) to Separator as Fuel
  - Sandpiper Exhaust Approximately 20 to 25 Mcfd
  - Exhaust can Operate Methanol Injection Pump if Burner is off
- **Scrubber System used to Prevent Backflow from Existing Fuel System**
- **Installed on 30 Pumps in Basin**
  - Recovered an Average of 15 Mcfd Per Pump
  - Over 120-Day Season, Device will Reduce Methane Emissions by 2.2 Tons Per Year

Process Flow Overview



Installed System



Solar Powered Methanol Circulation Pumps

- Pumps Run on Electricity and Battery Operated
- Battery is Charged by Solar Panel
- Gas Driven Pumps are Used as Backup During Times of Limited Sunlight
- Currently there are 12 Pumps in Operation as Pilot Test
- Project May be Expanded if Pilot Test Successful

Installed Solar Circulation Pumps