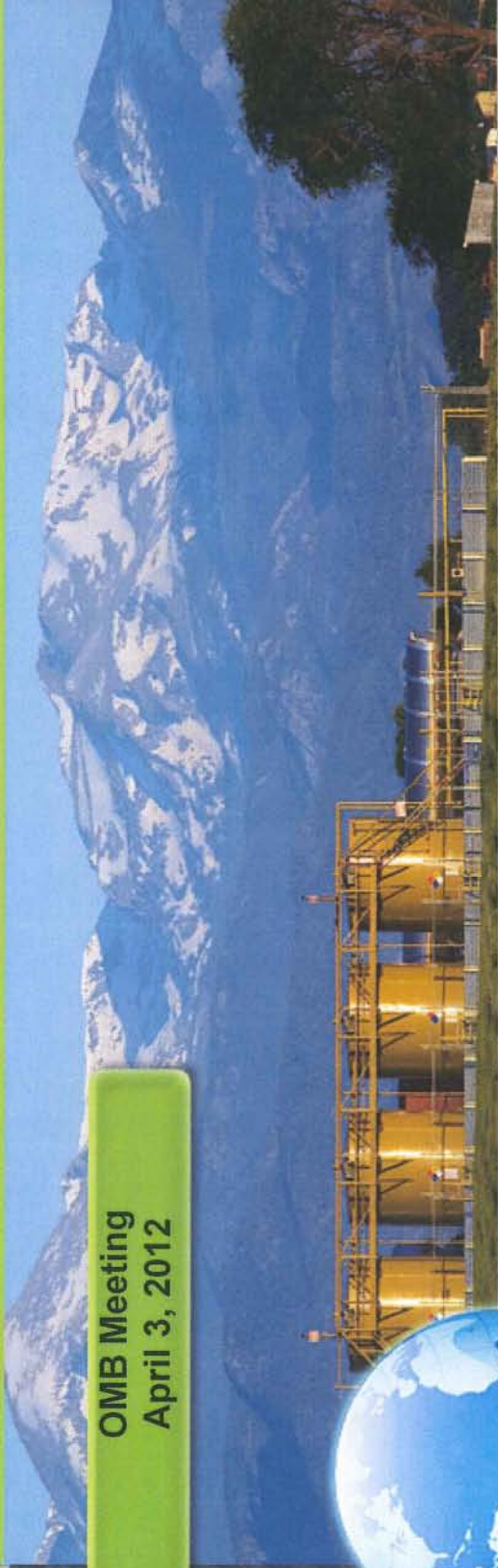


OMB Meeting  
April 3, 2012



Hydraulic Fracturing Disclosure/  
BLM Proposed Rule Making

**Anadarko Petroleum Corporation**

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## Goal of Hydraulic Fracturing Rule Making

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- **As the Steward of Public Lands, BLM has the Authority to Grant Permits to Drill, Complete, Equip and Operate Wells on the Lands They Manage.**
  
- **What is the Goal for BLM Hydraulic Fracturing Rule Making?  
Approval or Disclosure**
  
- **We Support Reasonable Disclosure and Encourage a Disclosure Process.**



# Anadarko's Concerns About Rule Making

- **Potential Delays Associated with Pre-Frac Approval**
  - Could BLM deny Hydraulic Fracture after well is drilled?
  
- **Pre-Frac Data Requirements**
  - Approval of Cement Bond Logs causing additional delay
  - State or Federal agencies must define usable water
  - Hydraulic Fracturing additives vary based upon temperature, water quality, and geologic factors
  - Chemical composition of flow-back fluids is unpredictable
  - Trade Secret Notification must be the responsibility of Service Provider
  
- **Post-Frac Disclosure in BLM Specific Format**
  - Most states are adopting FracFocus.org as the required reporting format
  - Would be a redundant reporting structure to states
  
- **Trade Secret Notification**
  - Operators are not privy to Trade Secret information
  - Trade Secret Notification Must Be the Responsibility of Service Provider
  - Conflicting Reporting Methods with States



# Well Life Cycle - Delays Associated with Frac Approval

## ■ Well initiation to TD cycle time – Step 1

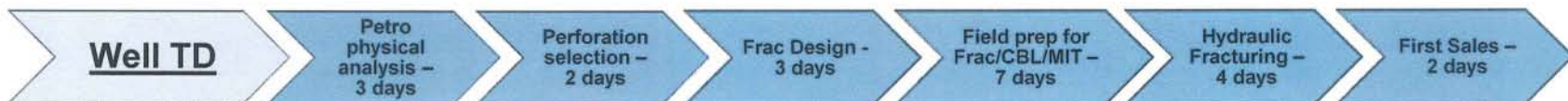
### Current State:



(Total 520 days)

## ■ Approval adds 35+ days to First Production cycle time – Step 2

### Current State:



(Total of 21 days)

### With Frac Approval Process Time:

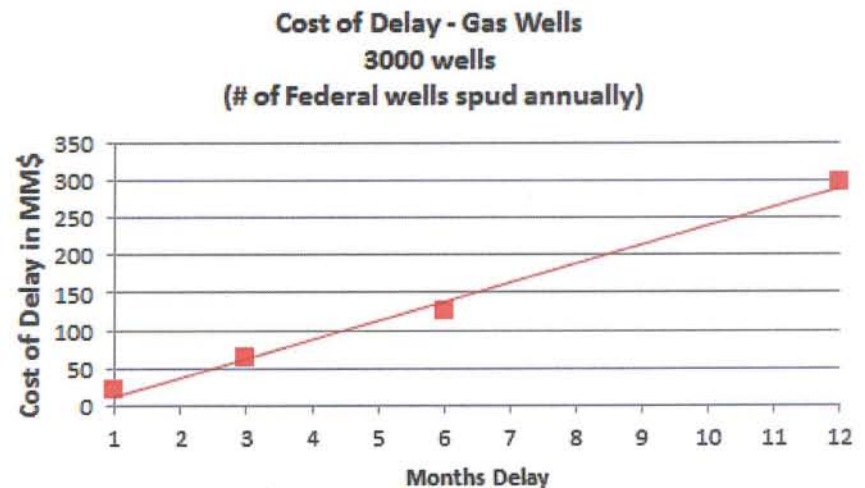
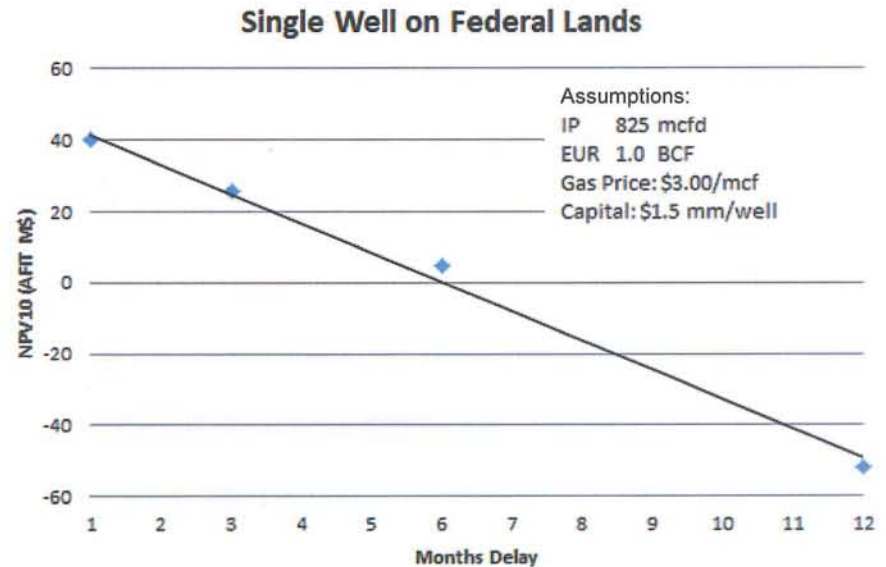


(Total of 56 - 386 days)

## ■ Well Life Cycle potentially increases from 541 days to 906 days

# The Cost of Delay – Gas Well on Federal Lands

- **Well Stimulation on Federal Lands**
  - 90% of Wells are Frac'd
  - Increased uncertainty with 2 Step Approval Process
  - 2011 Average APD Approval Time: 298 days (BLM Report on APD Processing)
- **Time is money**
  - Assuming 3,000 Wells per year drilled on federal lands -
    - Total Cost of Delay:
      - 30 days - \$21 MM
      - 90 days - \$63 MM
      - 180 days - \$126 MM
      - 365 days - \$297 MM
- **Assumes Well is Drilled and Waiting on Hydraulic Fracturing Approval**
- **Disclosure Instead of Approval**



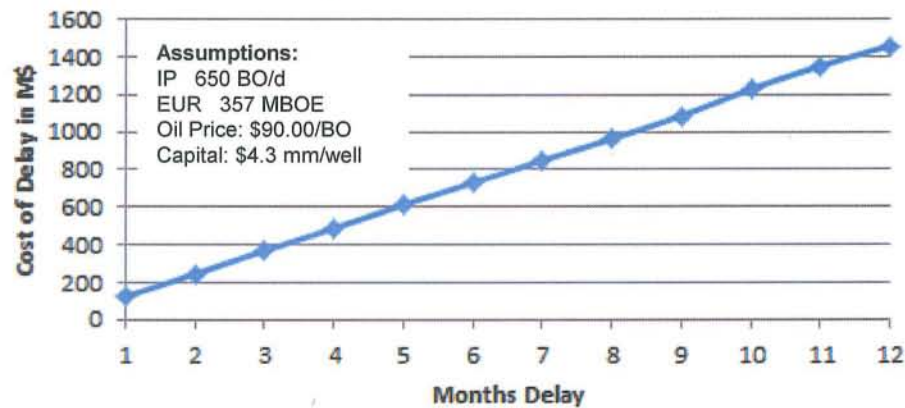
# The Cost of Delay – Horizontal Oil Well on Federal Lands

- **Niobrara Horizontal Well:**

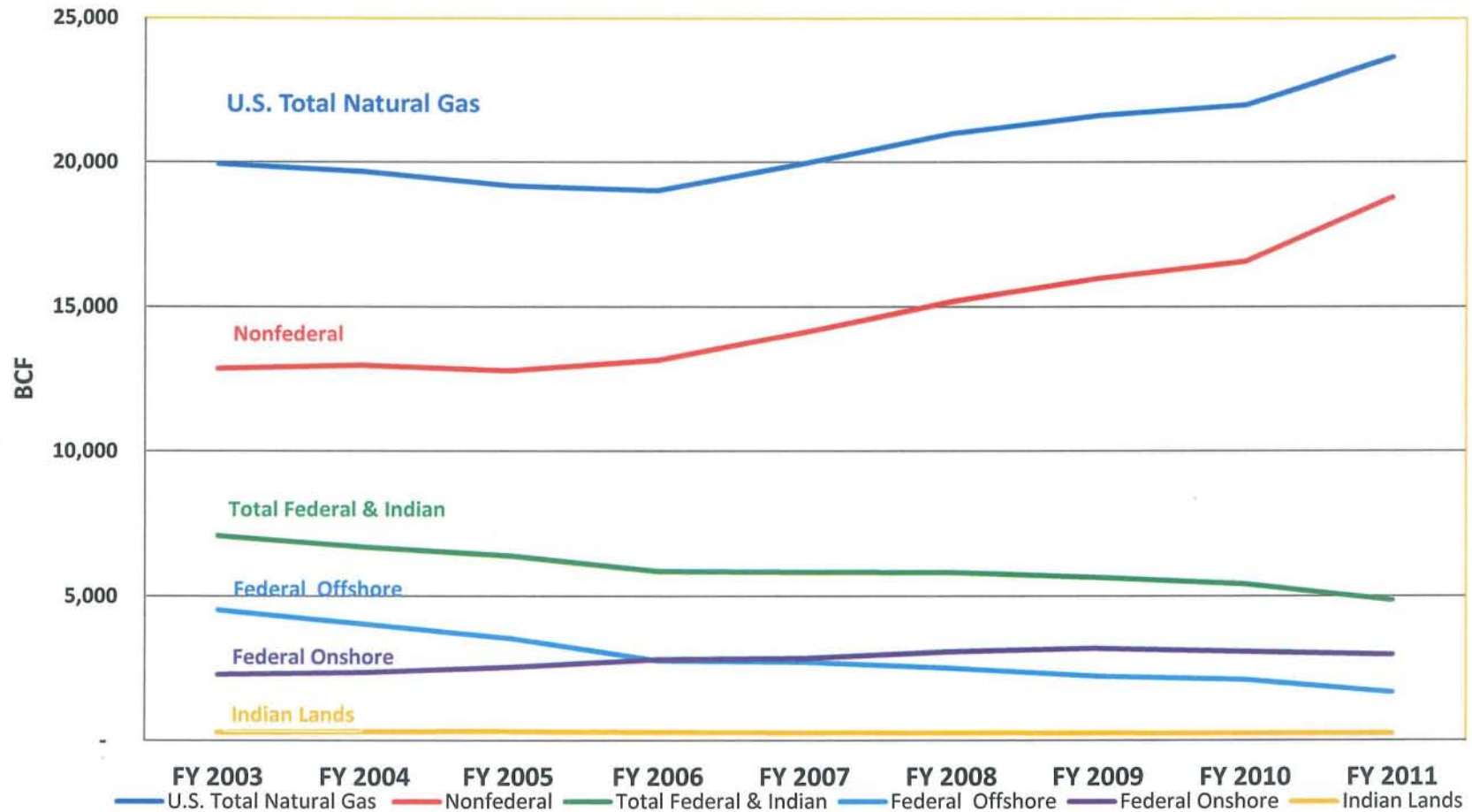
**Total Cost of Delay:**

- 30 days - \$123 MM
- 90 days - \$369 MM
- 180 days - \$729 MM
- 365 days - \$1458 MM

**Cost of Delay - Hz. Wells**  
(3000 Federal Wells)



## Sales of U.S Natural Gas Production 2003 - 2011



\* Sources: EIA Sales of Fossil Fuels from Federal & Indian Lands Report, March 2012; EIA Natural Gas Gross Withdrawals & Production Report, Feb. 29, 2012



# Frac Design Variability

## ■ Example of Frac Design Variability

	Water				Gasperm					
	Gals	CL-37	CL-23	BA-40L	1100	Vicon NF	CAT-3	CAT-4	FR-66	WG-18
Design	1390889	562	337	1685	2762	5615	278	180	182	29198
Actual	1302554	447	268	2684	2568	4745	166	76	239	28215
Variance	94%	80%	80%	159%	93%	85%	60%	42%	131%	97%
Supplied		559	336	3355	3210	5931	330	330	330	35269

## ■ Additives are Seasonal

- **Additional biocide is added in the summer to control bacteria**
  - *0.5 gals/Mgals is added*
  - *In the previous example, an additional 650 gals of biocides is utilized*





# FracFocus Sample Disclosure Form

Hydraulic Fracturing Fluid Component Information Disclosure							
Fracture Date:	2011-05-25						
State:	Colorado						
County:	Weld						
API Number:	12-345-67890						
Operator Name:	Client						
Well Name and Number:	Vertical Well #4						
Longitude:							
Latitude:							
Long/Lat Projection:							
Production Type:	Gas						
Total Vertical Depth (TVD):							
Total Water Volume (gal):							
<div style="border: 1px solid black; padding: 5px; display: inline-block; margin-top: 10px;">Well Information Section</div>							
Hydraulic Fracturing Fluid Comparison:							
Trade Name	Supplier	Purpose	Ingredients	Chemical Abstract Service Number (CAS #)	Maximum Ingredient Concentration in Additive (%)	Maximum Ingredient Concentration in HF Fluid (%) by	Comments
Water	Anderole	Base Carrier/Fluid				33.16346%	
Proppant	Callfrac	Proppant Agent				10.25540%	
Resin Coated Sand	Callfrac	Proppant Agent				7.35584%	
Claytreat-4390	BJ Services	clay Stabilization					
15% HCL Acid	Callfrac	Perf Breakdown					
DWP-621 Weccif	Callfrac	Cationic Friction Reducer					
DWP-937HE	Callfrac	Surfactant					
Frac-ids 1000	BJ Services	Bactericide					
			Crystalline silica, cristobalite	1464-4-05-1	30.00%	1.81956%	
			Fullerite	1302-92-0	100.00%	6.06203%	
			Silica, amorphous -fumed	7631-86-9	30.00%	1.81956%	
			Crystalline silica, quartz	14808-60-7	100.00%	7.24333%	
			N,N-dimethylacetamide	1009-14-0	2.00%	0.14827%	
			Phenol formaldehyde resin	900203-35-d	5.00%	0.26442%	
			Aluminum oxide	1344-28-1	100.00%	2.33485%	
			Ammonium chloride	12125-02-9	27.00%	0.01776%	
			Zirconium, acetate lactate non ester	69969-34-2	60.00%	0.02946%	
			Potassium carbonate	504-09-7	60.00%	0.00499%	
			Chloric acid, sodium salt	7782-19-2	10.00%	0.61533%	
			Sodium chloride	7647-14-0	30.00%	0.02493%	
			Acetic acid	64-19-7	30.00%	0.00628%	
			Ammonium acetate	631-61-8	100.00%	0.02093%	
			Ethanol	64-17-8	60.00%	0.09182%	
			Terpene and Terpenoid, sweet	646-47-72-2	5.00%	0.00764%	
			Sodium chloride	7647-14-0	30.00%	0.07281%	
			Sodium persulfate	7775-27-1	100.00%	0.00195%	
			2-Bromo-2-nitro-1,3-propanediol	52-91-7	100.00%	0.00500%	
			Tributyl tetradecylphosphonium	81741-28-0	10.00%	0.00072%	
			Guar gum derivative	Trade Secret	100.00%	0.36449%	
			Complex carbohydrates	Trade Secret	60.00%	0.02573%	
			Humic/fulvic enzyme	1002-54-5	15.00%	0.00008%	
			Oxalkyl ether	Trade Secret	95.00%	0.00050%	
			Sodium persulfate	7775-27-1	100.00%	0.00156%	
			Aluminum Silicate	1302-76-7	100.00%	6.06203%	
			Calcium chloride	10043-82-4	1.00%	0.00246%	
			Ethoxylated fatty acid	Trade Secret	10.00%	0.16152%	
			Nickelium chloride hexahydrate	7781-18-4	5.00%	0.01232%	
			Silica, amorphous -fumed	7631-86-9	1.00%	0.00368%	
			Sodium bicarbonate	144-55-8	5.00%	0.01842%	
			Sodium formate	141-53-7	5.00%	0.01232%	
			Sodium sulfite	7787-02-6	0.10%	0.00000%	
			Terpene, Orange Oil Blend	Trade Secret	5.00%	0.00716%	
			Water	7732-18-5	100.00%	0.06577%	
<div style="border: 1px solid black; padding: 5px; display: inline-block; margin-top: 10px;">Additives Section</div>							
<div style="border: 1px solid black; padding: 5px; display: inline-block; margin-top: 10px;">Ingredients Section</div>							
<p>* Total Water Volume sources may include fresh water, produced water, and/or recycled water</p> <p>** Information is based on the maximum potential for concentration and thus the total may be over 100%</p> <p>All component information for total user obtained from the supplier's Material Safety Data Sheet (MSDS). As such, the Operator is not responsible for inaccurate or incomplete information. Any questions regarding the content of the MSDS should be directed to the supplier who provided it. The Occupational Safety and Health Administration's (OSHA) regulations govern the criteria for the disclosure of this information. Please note that Federal Leasing is "proprietary", "trade secret", and "confidential business information" and the criteria for how this information is reported on an MSDS is subject to 29 CFR 1910.1200(f) and 1910.1201(d).</p>							



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# Summary

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- **Potential delays with Hydraulic Fracturing approval**
- **Pre-Frac reporting requirements are onerous**
- **Approved vs. actual Hydraulic Fracturing is inaccurate**
- **Concerned that BLM will deny fracture stimulation after well is drilled**
- **Trade Secret Protections**



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# Anadarko's Recommendations on Rule Making

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## ■ Pre-Frac Notification

- 15 Day notification prior to Hydraulic Fracturing

## ■ Pre-Frac Requirements

- Operator must certify all usable ground water as defined by State or Federal agencies has been isolated to protect them from contamination.
- Prior to well stimulation operator must perform a Cement Bond Log (CBL). If the CBL indicates all usable ground water is not isolated, Operator must notify the BLM within 24 hours and perform remedial work to isolate usable ground water.
- CBL is submitted with Form 3160-5 Post-Frac.
- Pre-Frac Disclosure of Hydraulic Fracturing additives will be at the upper limit of maximum concentration.
- Certification that stimulation fluid complies with all Federal, State and Local rules and regulations is the responsibility of the Service Provider.
- FracFocus format will be utilized to report Pre-Frac Disclosure.
- Eliminate chemical composition of flow-back fluids in Pre-Frac Disclosure.
- All other Pre-Frac notification requirements as proposed.

## ■ Post-Frac Disclosure in BLM Specific Format

- Utilize FracFocus.org as the required reporting format.
- Certification that stimulation fluid complies with all Federal, State and Local rules and regulations is the responsibility of the Service Provider.

## ■ Trade Secret Notification

- Implement state's language on trade secret notification

