



COMMONWEALTH OF PENNSYLVANIA  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
OIL AND GAS MANAGEMENT PROGRAM

<b>DEP USE ONLY</b>	
Site ID	Primary Fac ID
Client	Subfacility Id

### Completion Report

Well Information					
If you are submitting this Completion Report attached to the Well Record, you only need to enter the well API # in this section.					
Well Operator Range Resources-Appalachia, LLC	DEP ID# 141142	Well API # (Permit / Reg) 37-125-23931-00	Project Number	Acres 561.9166	
Address 380 Southpointe Blvd, Suite 300		Well Farm Name Rukavina Unit	Well # #5H	Serial #	
City Canonsburg	State PA	Zip Code 15317	County Washington	Municipality Cross Creek	
Phone 724-743-6700	Fax 724-743-6490	Email		USGS 7.5 min. quadrangle map Midway	
Check the appropriate submission: <input checked="" type="checkbox"/> Original Completion Report <input type="checkbox"/> Amended Completion Report					

STIMULATION BASE FLUID		
List Water Management Plan Approved Water Source(s) that were used	Water Management Plan ID No.	Volume (Gallons)
1. PA American Water Company/Rex Road Metering Vault	Source 16	91,266
2. PA American Water Company/Chapman Lane Metering Vault	Source 15	1,876,108
3.		
4.		
5.		
6.		
<b>Recycled Water Used</b>		<b>1,118,408</b>
<b>Other Base Fluid(s)/Components Used</b>		
1.		
2.		
<b>Total Base Fluid(s)/Components Used</b>		<b>3,085,782</b>

PERFORATION RECORD					
Stage No.	Perforation Date	Stage Perforated From	Stage Perforated To	Perf. Orientation (Vertical, Horizontal, Radial)	Formation
1	9/27/11	9795' MD	9605' MD	Horizontal	Marcellus Shale
2	10/12/11	9510' MD	9320' MD	Horizontal	Marcellus Shale
3	10/13/11	9225' MD	9035' MD	Horizontal	Marcellus Shale
4	10/14/11	8940' MD	8750' MD	Horizontal	Marcellus Shale
5	10/17/11	8655' MD	8465' MD	Horizontal	Marcellus Shale
6	10/18/11	8370' MD	8180' MD	Horizontal	Marcellus Shale
7	10/18/11	8085' MD	7895' MD	Horizontal	Marcellus Shale
8	10/19/11	7800' MD	7610' MD	Horizontal	Marcellus Shale
9	10/20/11	7515' MD	7325' MD	Horizontal	Marcellus Shale
10	10/21/11	7230' MD	7040' MD	Horizontal	Marcellus Shale
11				Horizontal	Marcellus Shale
12				Horizontal	Marcellus Shale

### STIMULATION FLUID ADDITIVES

Note: Trade secret or confidential proprietary information should be clearly identified as such and should be submitted on a separate sheet attached to this report.

Descriptive Additive Type	Chemical Component(s) listed on Material Safety Data Sheet of the Additive	CAS No. of Chemical Component	Chemical Component % By Volume in Additive	Chemical Component % By Volume used in Each Stage						
				Stage No. 1	Stage No. 2	Stage No. 3	Stage No. 4	Stage No. 5	Stage No. 6	
FR-200W	N/A	N/A	N/A	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%
FR-300W	N/A	N/A	N/A	0.0457%	0.0341%	0.0413%	0.0390%	0.0359%	0.0277%	0.0277%
MX 588-2	N/A	N/A	N/A	0.0072%	0.0072%	0.0070%	0.0070%	0.0073%	0.0073%	0.0073%
NE100	N/A	N/A	N/A	0.0003%	0.0003%	0.0003%	0.0003%	0.0003%	0.0003%	0.0003%
FE100L	N/A	N/A	N/A	0.0009%	0.0009%	0.0009%	0.0009%	0.0009%	0.0009%	0.0010%
37% HCL	HCL	7647-01-0	37.0%	0.0558%	0.0530%	0.0542%	0.0536%	0.0539%	0.0585%	0.0585%
CI-100	Methanol	67-56-1	92.5%	0.0006%	0.0006%	0.0006%	0.0006%	0.0006%	0.0006%	0.0006%
CI-100	Propargyl Alcohol	107-19-7	4.4%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%
MC B-8650	Glutaraldehyde	111-30-8	48.8%	0.0037%	0.0037%	0.0039%	0.0037%	0.0037%	0.0037%	0.0037%
MC B-8650	Methanol	67-56-1	0.7%	0.0001%	0.0001%	0.0001%	0.0001%	0.0001%	0.0001%	0.0001%
MC B-8520	4,4-Dimethyloxazolidine	51200-87-4	76.5%	0.0152%	0.0149%	0.0152%	0.0148%	0.0151%	0.0149%	0.0149%
MC B-8520	3,4,4-Trimethyloxazolodine	75673-43-7	5.0%	0.0010%	0.0010%	0.0010%	0.0010%	0.0010%	0.0010%	0.0010%
MC B-8520	2-Amino-2-methyl-1-propanol	124-68-5	1.0%	0.0002%	0.0002%	0.0002%	0.0002%	0.0002%	0.0002%	0.0002%
MC B-8520	Formaldehyde Amine	56652-26-7	0.5%	0.0001%	0.0001%	0.0001%	0.0001%	0.0001%	0.0001%	0.0001%

Please insert additional copies of this page if additional rows/stages are needed.



<b>STIMULATION INFORMATION (WELL)</b>			
Open Flow Production: Omcf/d @ 24hrs pos treatment	24 Hr. Open Flow Production: Omcf/d @ 24hrs pos treatment	24 Hr. Shut-in Pressure: N/A @ 24hrs post treatment	Flow Back Date:

**STIMULATION INFORMATION (STAGE)**

Complete a separate record for each stimulation stage. (Please insert additional copies of this page for additional stages).

<b>Stage No.:</b> 1	Stimulation Date: 10/12/11	Pump Rate: 61.8
Pressure (psi): 7898	Shut-in Surface Pressure: 3733	5 Minute Shut-in Surface Pressure: N/A
Propping Agent Type: Sand	Propping Agent Amount: 312,184	Propping Agent Size: 100 Mesh 30/50 Mesh
<b>Stage No.:</b> 2	Stimulation Date: 10/13/11	Pump Rate: 67.3
Pressure (psi): 7635	Shut-in Surface Pressure: 3657	5 Minute Shut-in Surface Pressure: N/A
Propping Agent Type: Sand	Propping Agent Amount: 306,601	Propping Agent Size: 100 Mesh 30/50 Mesh
<b>Stage No.:</b> 3	Stimulation Date: 10/14/11	Pump Rate: 65.2
Pressure (psi): 7381	Shut-in Surface Pressure: 3910	5 Minute Shut-in Surface Pressure: N/A
Propping Agent Type: Sand	Propping Agent Amount: 306,309	Propping Agent Size: 100 Mesh 30/50 Mesh
<b>Stage No.:</b> 4	Stimulation Date: 10/17/11	Pump Rate: 68.3
Pressure (psi): 6946	Shut-in Surface Pressure: 3798	5 Minute Shut-in Surface Pressure: N/A
Propping Agent Type: Sand	Propping Agent Amount: 306,285	Propping Agent Size: 100 Mesh 30/50 Mesh
<b>Stage No.:</b> 5	Stimulation Date: 10/17/11	Pump Rate: 67.8
Pressure (psi): 7074	Shut-in Surface Pressure: 3980	5 Minute Shut-in Surface Pressure: N/A
Propping Agent Type: Sand	Propping Agent Amount: 306,764	Propping Agent Size: 100 Mesh 30/50 Mesh
<b>Stage No.:</b> 6	Stimulation Date: 10/15/11	Pump Rate: 68.7
Pressure (psi): 6612	Shut-in Surface Pressure: 3916	5 Minute Shut-in Surface Pressure: N/A
Propping Agent Type: Sand	Propping Agent Amount: 308,575	Propping Agent Size: 100 Mesh 30/50 Mesh
<b>Stage No.:</b> 7	Stimulation Date: 10/19/11	Pump Rate: 68.7
Pressure (psi): 7068	Shut-in Surface Pressure: 3951	5 Minute Shut-in Surface Pressure: N/A
Propping Agent Type: Sand	Propping Agent Amount: 307,188	Propping Agent Size: 100 Mesh 30/50 Mesh

**WELL SERVICE COMPANIES (Provide the name, address, and telephone number of all well service companies involved.)**

Name	Name	Name
<b>Frac Tech</b>	<b>Multi-Chem</b>	<b>Renegade Services</b>
Address 16858 IH20	Address 200 Detroit Street	Address PO Box 852
City - State - Zip Ciscok, TX 76437	City - State - Zip Washington, PA	City - State - Zip Levelland, TX 79336
Phone 817-850-1008	Phone 325-486-7489	Phone 337/552-8401

*I do hereby certify to the best of my knowledge, information and belief that the information contained on this Completion Report is true and correct. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.*

<b>Well Operator's Signature</b>	<b>DEP USE ONLY</b>	
 Title: Completion Engineer: Jonathan Thomas Date: 11-16-11	Reviewed by:	Date:
	Comments:	

**STIMULATION INFORMATION (STAGE- Continued)**

Complete a separate record for each stimulation stage. (Please insert additional copies of this page for additional stages).

<b>Stage No.:</b> 8	Stimulation Date: 10/20/11	Pump Rate: 67.7
Pressure (psi): 6608	Shut-in Surface Pressure: 4000	5 Minute Shut-in Surface Pressure: N/A
Propping Agent Type: Sand	Propping Agent Amount: 308,531	Propping Agent Size: 100 Mesh 30/50 Mesh
<b>Stage No.:</b> 9	Stimulation Date: 10/21/11	Pump Rate: 68.3
Pressure (psi): 6482	Shut-in Surface Pressure: 4001	5 Minute Shut-in Surface Pressure: N/A
Propping Agent Type: Sand	Propping Agent Amount: 309,974	Propping Agent Size: 100 Mesh 30/50 Mesh
<b>Stage No.:</b> 10	Stimulation Date: 10/21/11	Pump Rate: 66.1
Pressure (psi): 6344	Shut-in Surface Pressure: 4018	5 Minute Shut-in Surface Pressure: N/A
Propping Agent Type: Sand	Propping Agent Amount: 309,453	Propping Agent Size: 100 Mesh 30/50 Mesh
<b>Stage No.:</b> 11	Stimulation Date:	Pump Rate:
Pressure (psi):	Shut-in Surface Pressure:	5 Minute Shut-in Surface Pressure: N/A
Propping Agent Type: Sand	Propping Agent Amount:	Propping Agent Size: 100 Mesh 30/50 Mesh
<b>Stage No.:</b> 12	Stimulation Date:	Pump Rate:
Pressure (psi):	Shut-in Surface Pressure:	5 Minute Shut-in Surface Pressure: N/A
Propping Agent Type: Sand	Propping Agent Amount:	Propping Agent Size: 100 Mesh 30/50 Mesh
<b>Stage No.:</b> 13	Stimulation Date:	Pump Rate:
Pressure (psi):	Shut-in Surface Pressure:	5 Minute Shut-in Surface Pressure: N/A
Propping Agent Type: Sand	Propping Agent Amount:	Propping Agent Size: 100 Mesh 30/50 Mesh
<b>Stage No.:</b> 14	Stimulation Date:	Pump Rate:
Pressure (psi):	Shut-in Surface Pressure:	5 Minute Shut-in Surface Pressure: N/A
Propping Agent Type: Sand	Propping Agent Amount:	Propping Agent Size: 100 Mesh 30/50 Mesh
<b>Stage No.:</b> 15	Stimulation Date:	Pump Rate:
Pressure (psi):	Shut-in Surface Pressure:	5 Minute Shut-in Surface Pressure: N/A
Propping Agent Type: Sand	Propping Agent Amount:	Propping Agent Size: 100 Mesh 30/50 Mesh
<b>Stage No.:</b> 16	Stimulation Date:	Pump Rate:
Pressure (psi):	Shut-in Surface Pressure:	5 Minute Shut-in Surface Pressure: N/A
Propping Agent Type: Sand	Propping Agent Amount:	Propping Agent Size: 100 Mesh 30/50 Mesh
<b>Stage No.:</b> 17	Stimulation Date:	Pump Rate:
Pressure (psi):	Shut-in Surface Pressure:	5 Minute Shut-in Surface Pressure: N/A
Propping Agent Type: Sand	Propping Agent Amount:	Propping Agent Size: 100 Mesh 30/50 Mesh



**Rukavina Unit #5H**  
**Well API: 37-125-23931**

**Completion Date: 10-21-11**  
**Township: Cross Creek**

% Composition of Hydraulic Fracture Fluid (by volume)						
Product Name	Additive	Purpose	Use and Dillution	Volume	Overall %	Common Uses
Water	Carrier Fluid	Creates fracture network in shale and carry proppant to the formation	Primary constituent	3,082,930 gal	95.57%	Water is the most abundant molecule on the Earth's surface
Sand	Sand	Allows fractures to remain open so gas can escape	Second most common constituent, making up almost 6% of the fluid	139,300 gal	4.32%	Drinking water filtration, play sand
FRW-300	Friction Reducer	Reduces friction between fluid and pipe	Diluted at one-half gallon per 1,000 gallons of water	1,109 gal	0.03%	Water treatment; soil conditioner; some children's toys
MC B-8650/B-8520	Antimicrobial Agent	Eliminates bacteria in the water that produce corrosive byproducts	Diluted at one-half gallon per 1,000 gallons of water	0,878 gal	0.03%	Water treatment, disinfectant, sterilize medical and dental equipment and surfaces
MX 588-2	Scale Inhibitor	Prevents scaling in pipe	Diluted at one-tenth gallon per 1,000 gallons of water	0,230 gal	0.01%	Water treatment, household cleaners, de-icing agent
HCL Acid (37%)	Perf Clean-Up	Dissolves cement and minerals to help initiate fractures	177 gallons per stage if required (non-diluted chemicals)	1,507 gal	0.05%	Swimming pool and household cleaner

**Composition of Hydraulic Fracture Fluid (by volume)**





## Composition of Components in Marcellus Shale Hydraulic Fracturing Fluid

**RANGE RESOURCES**

Common Name & Supplier	Supplier Chemical Name	Common Description	Hazardous Component listed on MSDS	Hazardous Component CAS No.	Purpose	MSDS Component Weight % of Chemical	Gallons MSDS Component in Well	Maximum Concentration of MSDS Component of Total Stage Fluid		
								% Vol	% Weight	
7.5% HCl Mixture (FracTech)	37% HCL	concentrated HCl Acid	HCL	7647-01-0	Cleans perforation	37.0%	1506.51	0.0467%	0.0191%	
	CI-100	Corrosion Inhibitor	Methanol	67-56-1	Protects casing	95.0%	17.54	0.0005%	0.0004%	
			Propargyl Alcohol	107-19-7	Protects casing	5.0%	0.75	0.0000%	0.0000%	
	NE100	Non- Emulsifer	No hazardous ingredients	N/A	Prevents emulsions	0.0%	N/A	N/A	N/A	
FE100L	Iron Chelator	No hazardous ingredients	N/A	Prevents precipitation	0.0%	N/A	N/A	N/A		
							<b>TOTAL</b>	<b>0.0473%</b>	<b>0.0195%</b>	
Friction Reducer (FracTech)	FRW-300	Friction Reducer	No hazardous ingredients	N/A	Reduce friction down casing	0.0%	N/A	N/A	N/A	
Scale Inhibitor (Multichem)	MX 588-2	Scale Inhibitor	No hazardous ingredients	N/A	prevents scale deposits	0.0%	N/A	N/A	N/A	
Antibacterial Agent (Multichem)	MC B-8520	Antibacterial Agent	4,4-Dimethyloxazolidine	51200-87-4	eliminates bacteria in water	78.0%	482.40	0.0150%	0.0140%	
			3,4,4-Trimethyloxazolidine	75673-43-7		5.0%	31.58	0.0010%	0.0009%	
			2-Amino-2-methyl-1-propanol	124-68-5		1.0%	6.62	0.0002%	0.0002%	
			Formaldehyde Amine	56652-26-7		0.5%	2.88	0.0001%	0.0001%	
	MC B-8650	Antibacterial Agent	Glutaraldehyde	111-30-8	eliminates bacteria in water	50.0%	90.58	0.0028%	0.0039%	
			Methanol	67-56-1		0.5%	0.91	0.0000%	0.0000%	
							<b>TOTAL</b>	<b>0.0191%</b>	<b>0.0192%</b>	
								<b>SUMMARY</b>	<b>by vol %</b>	<b>by weight %</b>
								<b>0.066%</b>	<b>0.039%</b>	