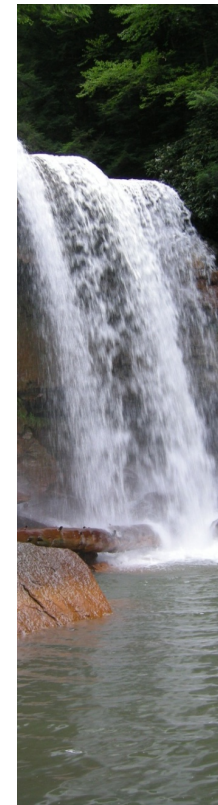


# Monitoring drinking water for contaminants related to oil and gas drilling

Roy Martin, PhD  
Downstream Strategies  
Morgantown, WV

People's Oil and Gas Summit  
2010



# Background and experience

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- Downstream Strategies
  - West Virginia
  - 9 employees
  - 10+ yrs experience
- Water Monitoring Program
  - Mining issues
  - Oil and gas drilling issues



# Overview

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- What to test for
- Finding an analytical lab
- When to test
- Self-testing vs. professional testing
- Important protocols



# Things to test for

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- Broad categories of pollutants
  - Salts
    - Na, Cl, Mg, Ca, K, etc.
  - Metals
    - Fe, Mn, Ba, As, Pb, etc.
  - Organics
    - Methane
    - Oil, Grease, Detergents, Surfactants, etc.



# Things to test for

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- Testing for all possible parameters
  - \$\$\$ in lab fees alone
- Balance costs with objectives
- Basic to comprehensive list of parameters



# Parameters to test for

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- **Total Dissolved Solids (\$11)**
- **Barium (\$11)**
- **Chloride (\$11)**
- **Methane (\$50)**
- pH (\$7)
- Iron (\$10)
- Manganese (\$10)
- Lead (\$11)
- Arsenic (\$11)
- Strontium (\$13)
- Bromide (\$13)
- Hardness (\$11)
- Alkalinity (\$10)
- Aluminum (\$10)
- Sulfate (\$11)
- TPH (ORO/DRO/GRO \$155)
- VOC (BTEX \$55)
- \$400-\$500

# Self-testing vs. professional testing

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- **Self-testing**

- Cheaper
- Save on labor costs (\$50/hr or more)

- **Professional testing**

- Independent and unbiased party
  - Vital for admissibility in court
- Access to specialized equipment
- Specialized scientific and technical knowledge

- **Dependent on objectives**

# When to test

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- **Pre-drilling**
  - Required testing (1000 ft)
  - Confirm results?
- **Post-drilling**
  - No requirements
  - Burden of proof
  - Increase in sediment, foaming, bubbling, taste (salty, metallic), odors (egg, fuel)
- **Continuous**
  - Cheap TDS meters (\$50)





# Analytical labs

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- Certified laboratories
  - Ensures accepted protocols
  - SDWA
  - Certified for
    - Inorganics, Organics, Microb., Metals, etc.,
- Look to agency websites for info:
  - e.g., DEP/DEQ

# Important protocols

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- **Different methods/bottles**
  - Certified lab instructions
  - Inorganics
  - Metals
  - Organics
- **Sampling procedures**
  - Pre-treatment
  - Purge
  - EPA, DEP



# Important protocols

- Holding times
- Holding temps
- Chain of Custody

**RELIANCE LABORATORIES, INC. - CHAIN OF CUSTODY RECORD**

POST OFFICE BOX 4657  
 BRIDGEPORT, WV 26330  
 TEL. (304) 842-5285 • FAX (304) 842-5351  
 E-MAIL [reliancelabs@wvdsi.net](mailto:reliancelabs@wvdsi.net)  
 INTERNET [www.RelianceLabs.net](http://www.RelianceLabs.net)

RIDGEFIELD BUSINESS CENTER  
 25 CRIMSON CIRCLE  
 MARTINSBURG, WV 25403  
 TEL. (304) 596-2084 • FAX (304) 596-2086

\*CLIENT NAME Downstream Strategies  
 \*ADDRESS \_\_\_\_\_  
 CUSTOMER # C06114 \*TEL.# \_\_\_\_\_ FAX# \_\_\_\_\_  
 \*SAMPLER(S) R. Martin E-MAIL 2

SHEET NO. 1 OF 1

LABORATORY #	*DATE	*TIME	S	R	M	MATRIX W, D, W, S, O, M	TEMP. ± 4°C		# OF CONTAIN.	HN03	H2SO4	HCL	NiOH	BAC-T	NO PRES.	PROJECT/REMARKS
							Yes	No								
<u>148915</u>	<u>8/18</u>	<u>10:27</u>				<u>W</u>		<u>3</u>	<u>2</u>	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>		

Ph Cond  
Alk Acid  
Soy Chlo  
FDS  
Hard.  
Fe Mn Al  
Ca Na

SAMPLES DO  DO NOT  MEET USEPA GUIDELINES FOR HOLDING TIMES  
 SAMPLES DO  DO NOT  MEET USEPA GUIDELINES FOR CHEMICAL PRESERVATIVES  
 SAMPLES DO  DO NOT  MEET USEPA GUIDELINES FOR SAMPLE CONTAINERS  
 SAMPLES ARE  ARE NOT  FOR REGULATORY COMPLIANCE PURPOSES

REMARKS: email [rmartin@downstreamstrategies.com](mailto:rmartin@downstreamstrategies.com) PWS# \_\_\_\_\_

WEATHER/TEMPERATURE: \_\_\_\_\_

RUSH STATUS (INITIAL ACCEPTANCE \_\_\_\_\_)  
 \*\*\* ADDITIONAL LABORATORY FEES MAY APPLY\*\*\*

**EXTENT OF LIABILITY**  
 SHOULD RELIANCE LABORATORIES, INC. BE AT FAULT AND ANY DISPUTE ARISE REGARDING ANALYTICAL DATA GENERATED BY THE LABORATORY, THE EXTENT OF THE LIABILITY TO RELIANCE WILL BE A DUPLICATE ANALYSIS OF THAT SAMPLE, PROVIDING ADEQUATE SAMPLE REMAINS, OR A REFUND OF THE ANALYTICAL FEE. IN NO EVENT WILL RELIANCE LABORATORIES BE LIABLE FOR DAMAGES INCLUDING BUT NOT LIMITED TO DIRECT, INDIRECT OR CONSEQUENTIAL DAMAGES ARISING FROM SUCH DISPUTE.  
 NOTE: TYPICAL SAMPLE TURN AROUND FOR ROUTINE SAMPLES IS 5 TO 10 WORKING DAYS. THIS IS NOT A GUARANTEE THAT SAMPLES WILL BE COMPLETED IN THIS TIME FRAME, HOWEVER, NON-ROUTINE SAMPLES MAY REQUIRE ADDITIONAL TIME.

**\* TO BE COMPLETED BY CLIENT**

ORIGINAL CHAIN OF CUSTODY DOCUMENT MUST BE EXECUTED IN INK      WHITE - LABORATORY      YELLOW - CLIENT



# Concluding remarks

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- Pre-drilling and post-drilling data
- Independent sampler
- Certified Lab
- Chain of Custody
  - Important protocols

# Questions?

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