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# Baseline Groundwater Quality Monitoring Program

2012 Sustaining Colorado  
Watersheds Conference

October 10, 2012

## ▶▶▶ Concept



- Pre and Post-completion groundwater samples around new well starts
- Increased transparency & accountability for industry
- Allows public to search all public records on COGCC Website



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## ▶▶▶ Program Details



### **When will samples be taken?**

- New wells and pad expansions
  - Baseline samples
  - Post-Completion samples
  - Sample collected within 48 hours of notified complaint



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# ▶▶▶ Program Details



## **Baseline Samples**

- Before setting surface casing

## **Post-Completion Samples**

- Single Well Pad
  - Within 1 year of well completion
- Multi-Well Pad
  - Every 2 years as wells are actively added
  - Within 1 year after last well or before an extended break



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## ▶▶▶ Program Details



- Sampling Locations
  - Permitted Wells
  - Springs/Seeps
- Two closest within  $\frac{1}{2}$  mile of well pad surface location
- Sampling only with landowner approval



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# ▶▶▶ Identify Sampling Locations

The screenshot displays the COGCC GISOnline interface. The main map area shows a grid of land parcels with various well locations marked by colored circles. A red arrow points to a well labeled 'Oil & Gas Well', and a blue arrow points to a well labeled 'Water Well'. The interface includes a toolbar at the top with options like Zoom, Selection Results, Intersect, Add Point, Redline, Copy, Lat/Long, and Help. A layers panel on the left lists various data layers such as O&G Facilities, Water Resources, and Geology. The status bar at the bottom shows '1 feature selected', coordinates '1: 14502.11', and a scale of '3.14 x 1.62 (mi)'. The interface is powered by MapGuide.

## Water Well

- Receipt No., Permit No., Owner, Depth
- Linked to DWR Database



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## ▶▶▶ Sample Collection



- Sampling Procedures (SAP) developed in cooperation with COGCC
- Each location assigned COGCC Facility ID



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## ▶▶▶ Sample Collection

- Standard procedures for collecting samples



Remove aerator.  
Attach apparatus to faucet  
feed tubing to a clean 5  
gallon bucket and fill to the  
top.



Place un-preserved sample  
vial under water and  
remove cap. Hold tubing  
and allow flow into vial and  
displace two vial volumes.



Make sure vial is at the  
bottom of the bucket and  
replace cap to trap any  
dissolved methane.



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## ▶▶▶ Sample Analysis



- Basic Quality Analysis
  - pH, TDS, alkalinity
  - Nutrients (nitrogen, phosphorus)
  - Major anions and cations
  - Dissolved gases
  - BTEX



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## ▶▶▶ Sample Analysis

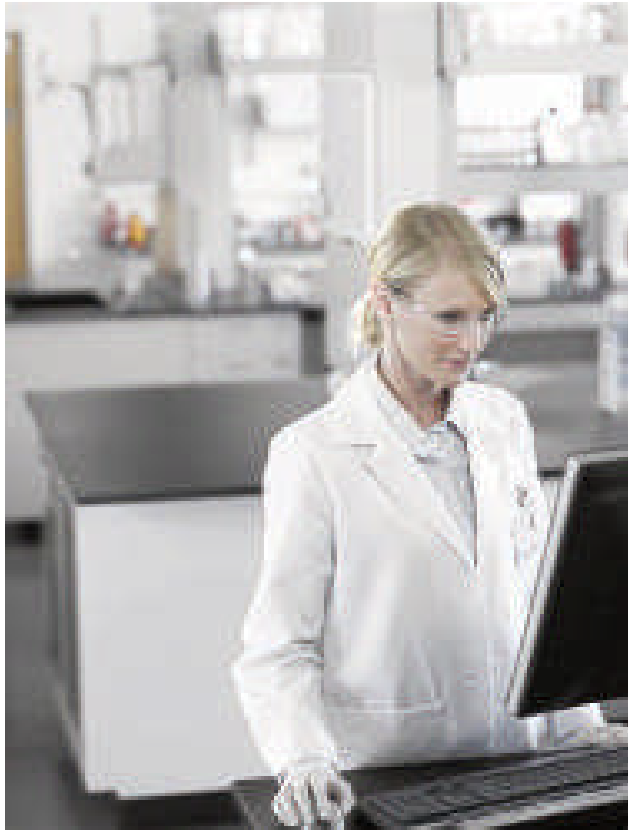


- Compositional Analysis
  - If dissolved methane is present ( $>1$  mg/L)
  - Additional gases (C1 – C6)
  - Isotopic analysis



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## ▶▶▶ High Quality Data



- Quality Data
  - Standard field procedures
  - Experienced groundwater sampling technicians
  - Accredited laboratory
  - Approved laboratory methods
  - QA/QC samples



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## ▶▶▶ Analytical Program and Quality Assurance

### ■ Sampling QA/QC

- Field Duplicates – 1 per 20 samples, not less than 1 per year.
- Field Equipment Blanks – If decontamination procedures are used on equipment.
- Field Blanks – Only if site conditions may cause cross contamination by VOCs or methane (i.e. engine running nearby)
- MS/MSD – as specified per method.



# ▶▶▶ Analytical Program and Quality Assurance

## Data Quality Review Sheet

### Sample Information

Sample ID: \_\_\_\_\_  
Date Collected: \_\_\_\_\_  
Site Address: \_\_\_\_\_  
Site Contact: \_\_\_\_\_  
Phone #: \_\_\_\_\_

### Field Sampling Data Sheet Review

#### Wells:

Was the well properly purged? **Y N**  
Was the flow rate reduced prior to sampling? **Y N**  
Did field parameters stabilize prior to sampling? **Y N**  
Did site conditions or other factors suggest that the samples may not be representative of groundwater? **Y N** If Yes, describe: \_\_\_\_\_

#### Seeps/Springs:

Were field parameters measured prior to sampling? **Y N**  
Did site conditions or other factors suggest that the samples may not be representative of groundwater? **Y N** If Yes, describe: \_\_\_\_\_

### Laboratory Data Package Review

Was proper chain-of-custody maintained? **Y N**  
If No, describe: \_\_\_\_\_

Were all samples analyzed for the requested analyses? **Y N**  
If No, can the remaining sample be analyzed within hold time? **Y N**

Were the proper methods used? **Y N**  
If No, can the remaining sample be analyzed within hold time? **Y N**

Were all sample holding time limits met? **Y N**  
Were laboratory quality assurance samples collected and analyzed? **Y N**  
Were laboratory quality assurance sample results within acceptance limits? **Y N**  
If No, describe: \_\_\_\_\_

Were field duplicate samples submitted? **Y N**  
If field duplicate samples were submitted, were the original and duplicate sample values  $\geq$  five times (5x) the practical quantitation limit (PQL)? **Y N**  
If the original and duplicate sample values were  $\geq$  five times (5x) the PQL, were the RPD values  $\leq$  20%? **Y N**  
If No, describe: \_\_\_\_\_

- Data Quality Review
  - Field Data Review
  - Laboratory report review
    - Hold Times
    - Methods
    - Lab QA
  - Corrective Actions?
  - Data Suitability Statement



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## ▶▶▶ Public Access/Outreach

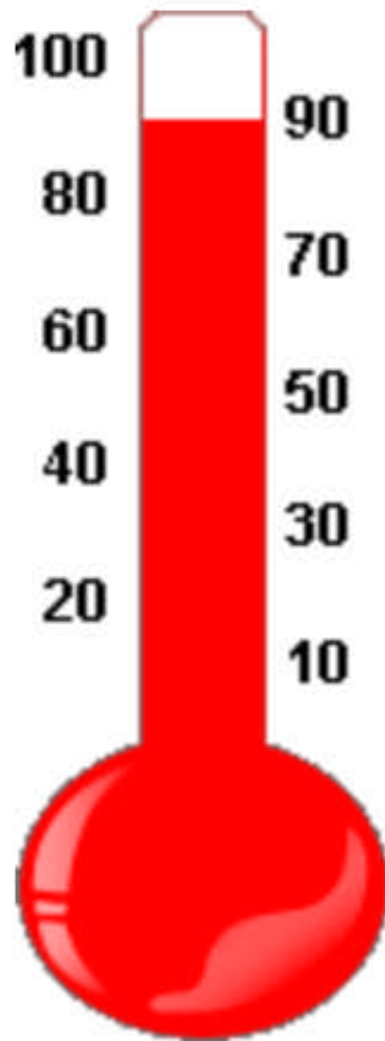


- Landowners notified of results in a timely manner
- Landowners provided with educational material
- Samples available to public via database on COGCC website
- Annual review of program implementation and results



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## ▶▶▶ Industry Participation



- Program started January 1, 2012
- Open to All Operators – not just COGA members
- Over 90% Participation to date
- Goal – 100%



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## ▶▶▶ More Information

- More information available on COGA Website
  - Sampling & Analysis Plan
  - Training Webcasts



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### Contact Us

Thank you for your interest in Colorado's oil and gas industry!



Photo courtesy of Whiting Petroleum

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▶▶▶ Thank You!

***Thank you for your interest in  
the COGA Baseline Program!***

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