

PAPA Groundwater Monitoring, 2013

PAPA Annual Operators Planning Meeting, August 5th 2014



Delsa Allen

Groundwater Monitoring Program Manager
Sublette County Conservation District

What is currently tested for?

Field parameters

- pH
- Temperature
- Conductivity
- Total Dissolved Solids (TDS)
- Water level when possible

Lab analysis

- Alkalinity
- Calcium
- Chloride
- Fluoride
- Magnesium
- Potassium
- Sodium
- Sulfate
- Conductivity
- Total Dissolved Solids (TDS)
- Gasoline Range Organics (GRO)
- Diesel Range Organics (DRO)

BTEX SW 8021B (as needed)

- Benzene
- Ethylbenzene
- m+p-Xylenes
- o-Xylene
- Toluene

BTEX SW 8260B extended list (as needed)

Same parameters as
BTEX 8021B plus 72 other
hydrocarbon-related parameters



Changes in Hydrocarbon (Organics) Testing

2004

- Non-Polar was used every time / no detections

2005

- Non-Polar was used approximately every 10th sample / no detections

2006 and 2007

- Non-Polar was used approximately every 10th sample / started getting detections
 - confirmation samples collected, with GRO and BTEX 8021B added to analysis

2008 and 2009

- Non-Polar was no longer used, instead GRO and DRO would be used, every time
 - confirmation samples collected, with BTEX 8021B being added to analysis

2010 - 2013

- GRO and DRO every time
 - confirmation samples collected, with BTEX 8021B and BTEX 8260B being added to analysis

*“...that flow chart like thing that shows how wells
with detects move from no detects up or down and wells
with detects move up to above standards or down.”*

-Cally McKee

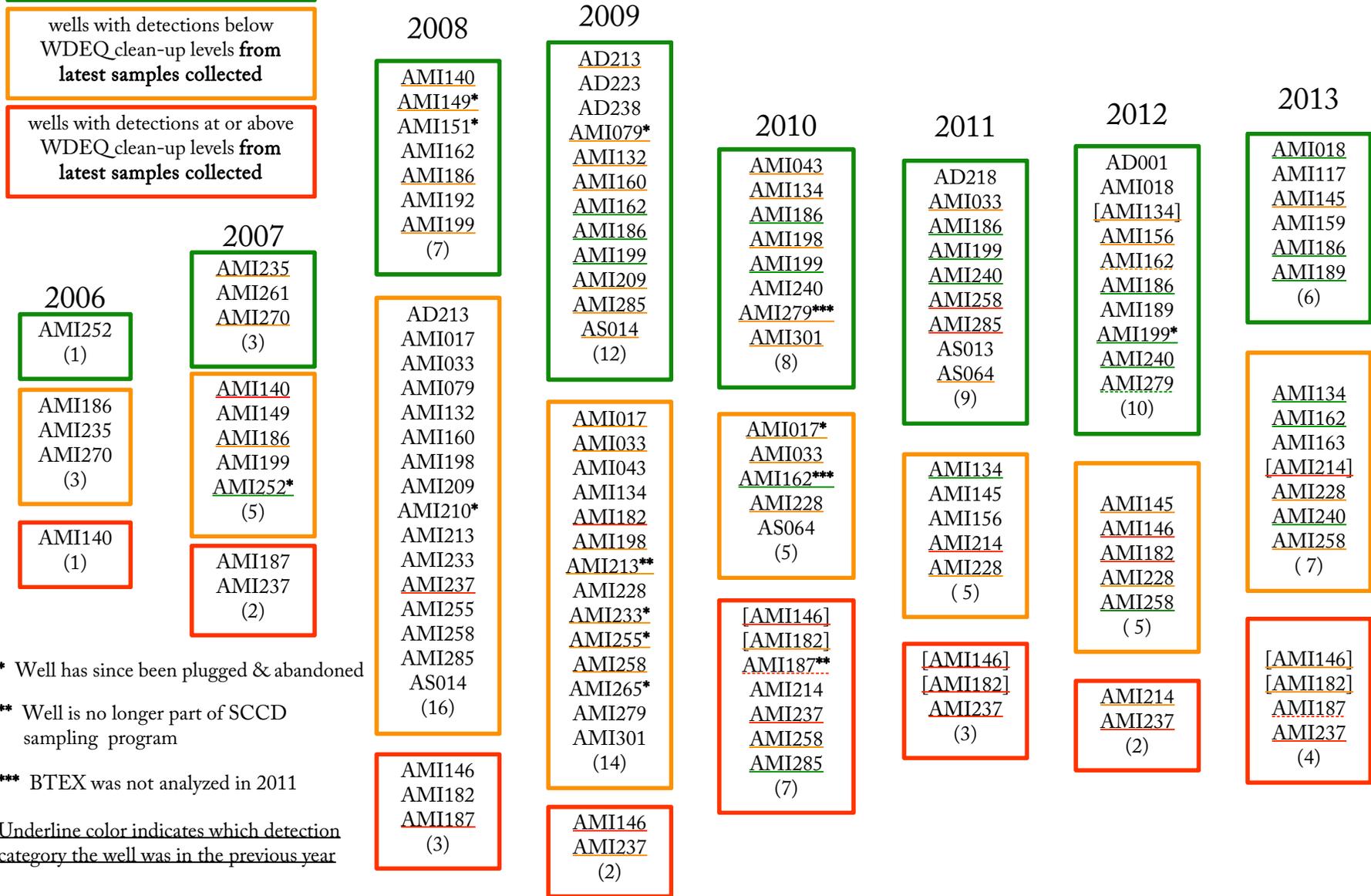
AMI: Miscellaneous-use / AD: Domestic-use / AS: Stock-use

detection category placement based on DRO, GRO and BTEX method 8021 results

wells with previous hydrocarbon detections, **final results** show "non-detect"

wells with detections below WDEQ clean-up levels **from latest samples collected**

wells with detections at or above WDEQ clean-up levels **from latest samples collected**



* Well has since been plugged & abandoned

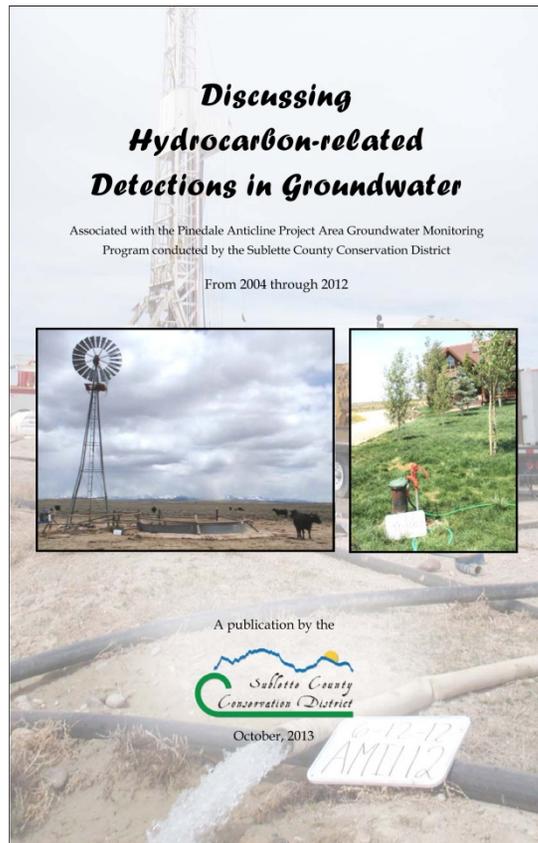
** Well is no longer part of SCCD sampling program

*** BTEX was not analyzed in 2011

Underline color indicates which detection category the well was in the previous year

[] Well can be placed into different detection category when BTEX method 8260 used

Number of wells per year with hydrocarbon-related detections



		2004 2005 2006 2007 2008 2009 2010 2011 2012 2013													
Analysis used	Non Polar GRO & DRO	●	○	○	○	○	○	○	○	○	○	○	○	○	○
Additional analysis when confirmation samples were collected	GRO BTEX 8021 BTEX 8260	●	●	●	●	●	●	●	●	●	●	●	●	●	●

Number of wells with hydrocarbon-related detections	Analysis used	Domestic Stock	Domestic Miscellaneous	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
				Non Polar	0	0	0	0					
GRO below WDEQ CUL	Domestic Stock	0	0	0	1	1	0	1	0	0	0	0	0
	Miscellaneous	1	5	14	9	9	8	8	11				
GRO at or above WDEQ CUL	Domestic Stock	0	0	0	0	1	0	0	0	0	0	0	0
	Miscellaneous	1	0	1	0	0	0	0	0	0	0	0	0
DRO below WDEQ CUL*	Domestic Stock	0	2	0	0	1	0	0	0	0	0	0	0
	Miscellaneous	8	7	0	0	3	6	3					
DRO at or above WDEQ CUL*	Domestic Stock	0	0	0	0	0	0	0	0	0	0	0	0
	Miscellaneous	3	0	3	0	1	1						
BTEX 8021 below WDEQ CUL	Domestic Stock	0	0	0	1	0	0	0	0	0	0	0	0
	Miscellaneous	4	8	11	14	10	7	8	11				
BTEX 8021 at or above WDEQ CUL	Domestic Stock	0	0	0	1	0	0	0	0	0	0	0	0
	Miscellaneous	1	3	3	4	5	3	3	5				
BTEX 8260 below WDEQ CUL	Domestic Stock								0	0	0	0	0
	Miscellaneous								9	7	7	9	
BTEX 8260 at or above WDEQ CUL	Domestic Stock								0	0	0	0	0
	Miscellaneous								2	1	1	1	1

CUL = Clean Up Level

*A DRO CUL of 10 mg/L is used for the above chart since the actual CUL can not be determined from SCCD data.

		2004 2005 2006 2007 2008 2009 2010 2011 2012 2013											Totals 2004-2013			
Total wells with hydrocarbon related detections below WDEQ CUL	Domestic Stock	0	0	0	0	1	2	0	1	1	0	0	0	5	43	GRO, DRO, primary BTEX 8021 and BTEX 8260
	Domestic Miscellaneous	0	0	4	8	20	19	13	9	15	16			1		
	Miscellaneous	0	0	4	8	20	19	13	9	15	16			43		
Total wells with hydrocarbon related detections at or above WDEQ CUL	Domestic Stock	0	0	0	0	0	1	0	0	0	0	0	0	1	11	GRO, DRO and primary BTEX 8021
	Domestic Miscellaneous	0	0	1	3	5	3	7	3	4	5			0		
	Miscellaneous	0	0	1	3	5	3	7	3	4	5			11		
Total wells with hydrocarbon related detections below WDEQ CUL	Domestic Stock	0	0	0	0	1	2	0	1	1	0	0	0	5	39	GRO, DRO and primary BTEX 8260
	Domestic Miscellaneous	0	0	4	8	20	19	13	9	15	16			2		
	Miscellaneous	0	0	4	8	20	19	13	9	15	16			39		
Total wells with hydrocarbon related detections at or above WDEQ CUL	Domestic Stock	0	0	0	0	0	1	0	0	0	0	0	0	1	7	GRO, DRO and primary BTEX 8260
	Domestic Miscellaneous	0	0	1	3	5	3	7	3	4	5			0		
	Miscellaneous	0	0	1	3	5	3	7	3	4	5			7		

Primary BTEX parameters include only those that have set WDEQ CULs

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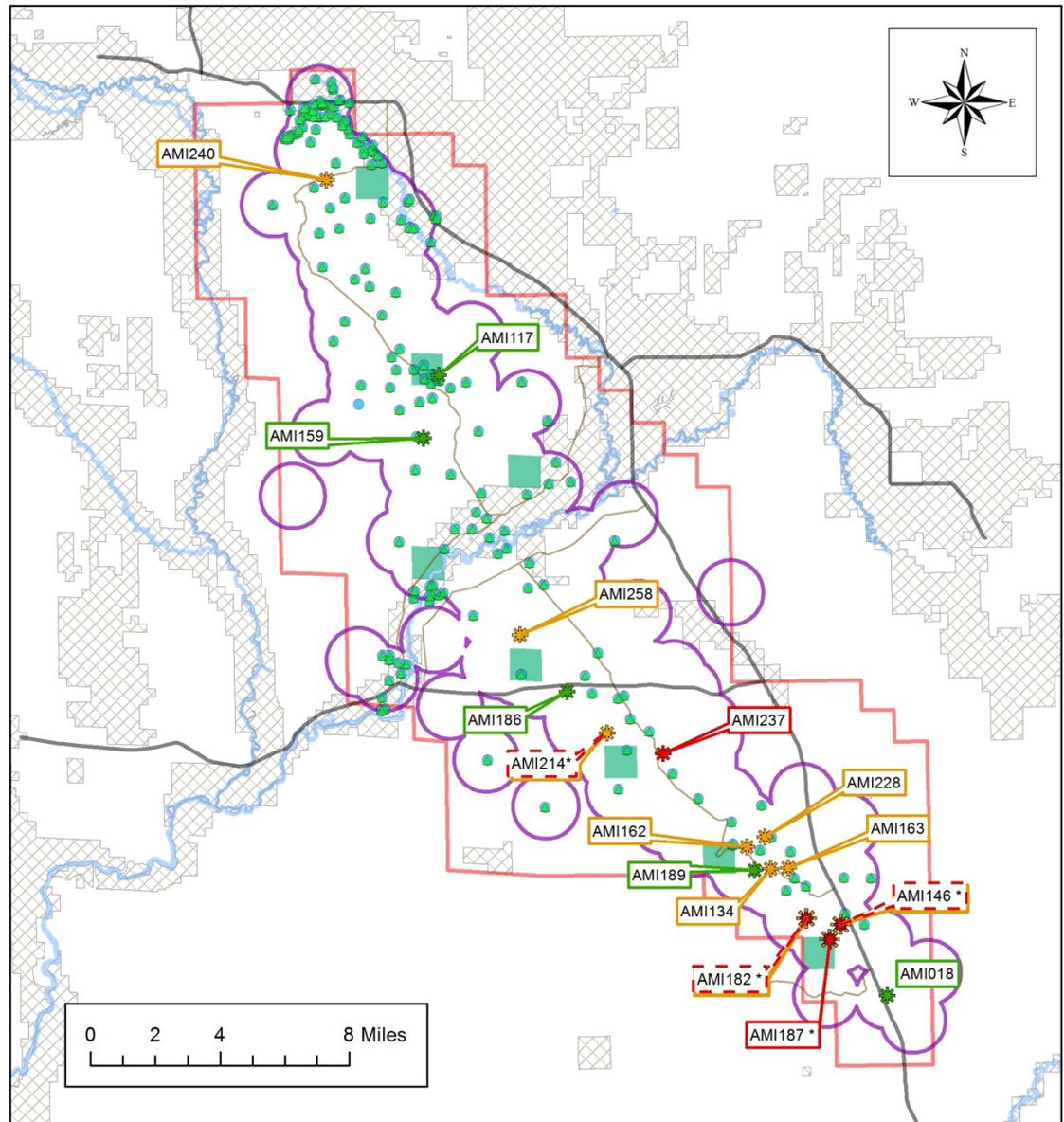
Status of Wells With Past Hydrocarbon Detections and Their Locations

Status of wells (last time sampled by SCCD)

-  Hydrocarbon detections under WYDEQ clean-up levels
-  Hydrocarbon detections over WYDEQ clean-up levels
-  Hydrocarbons non-detectible

-  State land within PAPA
-  Private lands
-  Main rivers
-  Main highways
-  Secondary roads within PAPA
-  Pinedale Anticline Project Area
-  One mile sampling area
-  Wells visited in 2013

* Benzene result discrepancies between BTEX methods



QUESTIONS?

Latest annual groundwater reports:

http://www.blm.gov/wy/st/en/field_offices/Pinedale/pawg/DataResults.html