Cabot Oil & Gas Corporation

DEP Meeting

October 11, 2011

Decision making for the long-term

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Agenda

- COSA Obligations
- Geological Overview
- Water Well Summary
  - Treatment System Evaluation
  - Water Recommendations
- Gas Well Summary
  - Category I
  - Category II
  - Category II
- Summary

COSA Obligations

Obligations Required to Stop Delivering Water

- Establish escrow funds – ¶ 6(a)(i) ☑
- Notify property owners of availability of escrow funds – ¶ 6(a)(ii) ☑
- Notify property owners of availability of methane mitigation systems – ¶ 6(b) ☑
- Receive written notice from the DEP that the above items (establish escrow and notify property owners) have been complied with – ¶ 6(c) ☐

Written Notice from the DEP

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION
NORTHWEST REGIONAL OFFICE

May 9, 2011

CERTIFIED MAIL NO. 7010 1670 0001 9470 9624

Mr. Phillip Stalnaker
Vice President, Regional Manager
Cabot Oil & Gas Corporation
Five Penn Center West Suite 401
Pittsburgh, PA 15276-0120

Re: December 15, 2010 Consent Order and Settlement Agreement
Department Review and Analyses of Submissions from Cabot
Dimock and Springville Townships, Susquehanna County

Dear Mr. Stalnaker:

The Depar
Corporati
2011, rela
December
information from other sources relating to these obligations.

Cabot's completion of the actions identified above satisfies the requirements under Paragraphs 6.b. through 6.f. of the 2010 Agreement.

As you are aware, Paragraph 4 of the 2010 Agreement provides that Cabot may not begin any hydrofracturing or new drilling within the "Affected Area" defined in the 2010 Agreement until it receives written notice from the Department of Cabot's compliance with the requirements of the 2010 Agreement. Based upon the Department's review and analyses, Cabot has yet to achieve full compliance with some of the requirements of the 2010 Agreement, and further information from and actions by Cabot, as described below, are necessary before the Department can determine whether or not Cabot is in compliance with other requirements of the 2010 Agreement. For these reasons, the Department is unable to provide Cabot with written authorization to commence any hydrofracturing or new drilling within the "Affected Area" at this time.

Following are the Department's requests for further information from and actions by Cabot that are necessary for Cabot to achieve compliance with certain of the requirements of the 2010 Agreement, or for the Department to determine whether or not Cabot is in compliance with other requirements of the 2010 Agreement.

[1] The specific documents submitted by Cabot and reviewed and analyzed by the Department are listed in Exhibit A, and copies of these documents have been placed in the public file for this matter, which is located in the Department's Northcentral Regional Office in Williamsport, PA.

230 Chestnut Street | Meadville, PA 16335
814.332.6860 | Fax 814.332.6120
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Obligations Required to Stop Delivering Water

- Establish escrow funds – ¶ 6(a)(i) ☑
- Notify property owners of availability of escrow funds – ¶ 6(a)(ii) ☑
- Notify property owners of availability of methane mitigation systems – ¶ 6(b) ☑
- Receive written notice from the DEP that the above items (establish escrow and notify property owners) have been complied with – ¶ 6(c) ☑

Obligations Required to Begin Fracing in the Box

- Obligations relate to seven wells – ¶ 4(a)
  - Hibbard 2H
  - Hibbard 4
  - Ely 1H
  - Baker 3H
  - Gesford 4R
  - Gesford 8H NW
  - Kelly 1H

- As to these wells, comply with ¶¶ 3(a) and 5(a) of COSA
  - ¶ 3(a): Comply with COSA and environmental laws
  - ¶ 5(a): Gas well pressure testing

Obligations Required to Begin Fracing in the Box

- Provide to DEP hydrocarbon bearing intervals – ¶ 5(a)(i) ☑
- Pressure test each accessible annuli – ¶ 5(a)(ii) ☑
- If pressure data indicates compliance with Ch. 78, wells will not be considered discharging natural gas – ¶ 5(a)(iv) ☑

Obligations Required to Begin Drilling in the Box

(Overview)

- Comply with ¶ 5
  - Gas well pressure testing
  - Water screening and sampling
- Comply with COSA and environmental laws
- Written notice from DEP

Pressure Testing

- Provide to DEP hydrocarbon bearing intervals – ¶ 5(a)(i)
- Pressure test each accessible annuli – ¶ 5(a)(ii)
- If pressure data indicates compliance with Ch. 78, wells will not be considered discharging natural gas – ¶ 5(a)(iv)

Obligations to Drill in Box

Screening / Water Sampling

- Screen and analyze for free combustible gas – ¶ 5(b)(i)-(iii) ☑
- Show that either: ☐
  - No combustible free gas is present in water wellhead, ***or***
  - Levels of combustible free gas, if properly vented, do not pose a danger to persons or property, ***and***
  - The concentration of dissolved methane is below 7 mg/l

  ¶ 5(b)(iv)

Obligations to Drill in Box

Methane Concentration

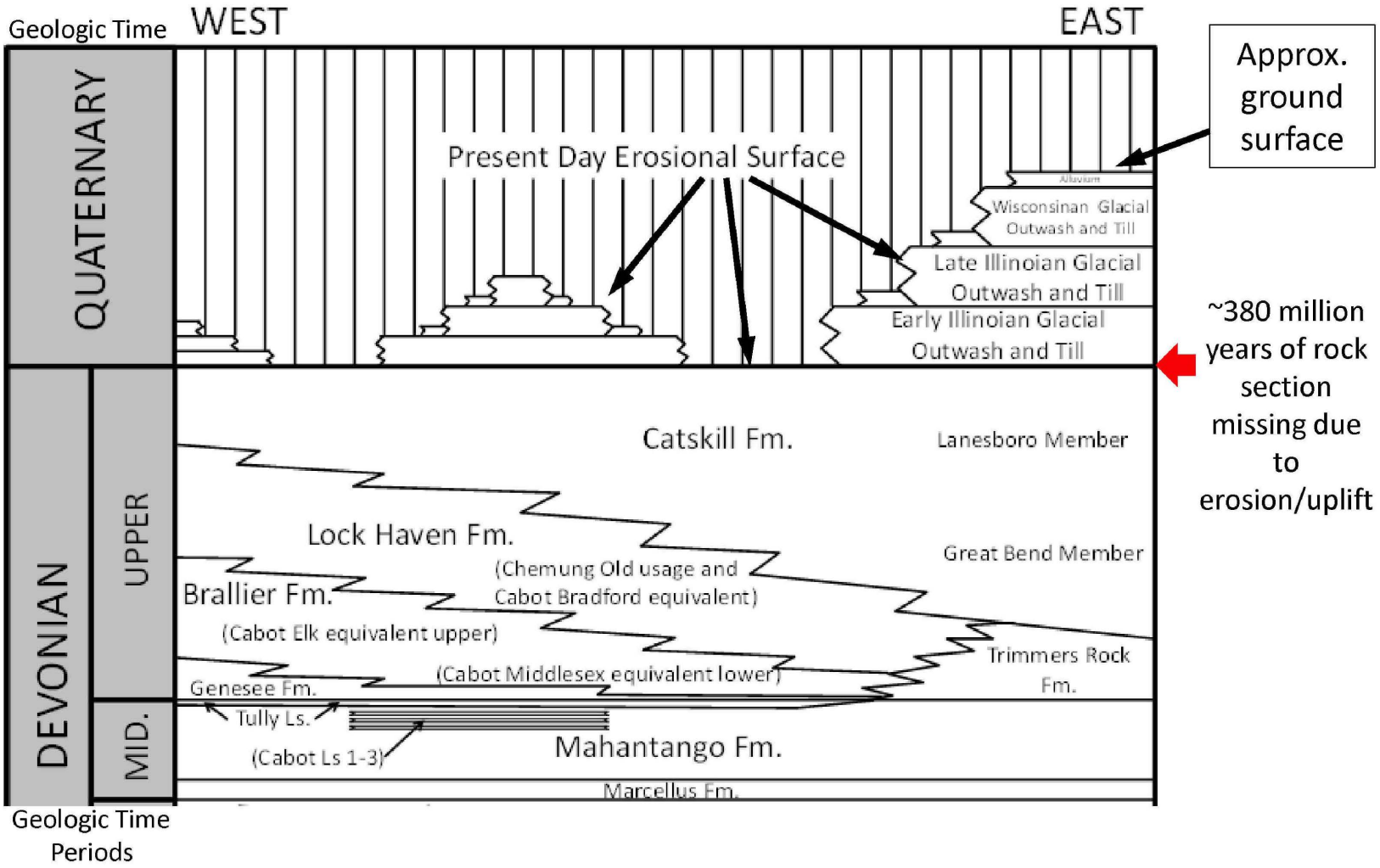
- DEP determines that methane concentration is at background levels, ***or***

- Continue sampling until 75% of water samples within each monitoring point contains 7 mg/l or less of dissolved methane over 8 quarters
- No individual water sample exceeds 14 mg/l

¶ 5(b)(iv)

Geological Overview

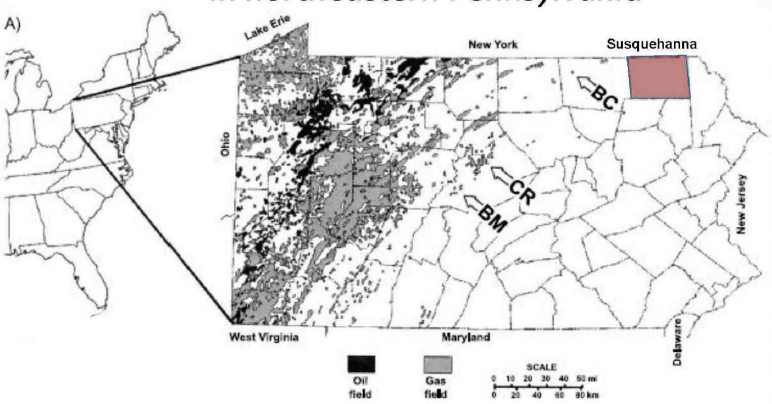
Surface Geology and Shallow Stratigraphy – Susquehanna County Area



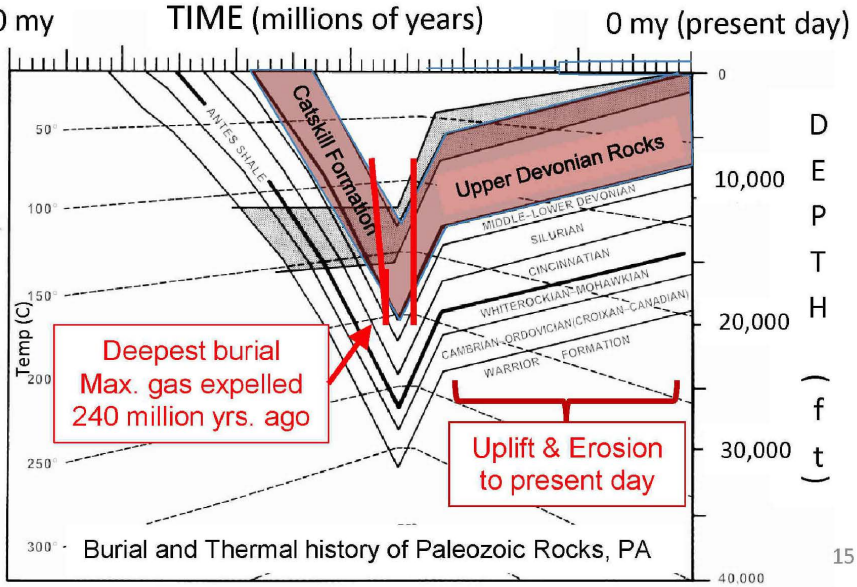
Upper Devonian burial depths, gas generation, uplift

- Deposited ~380 My in marine and fluvial environments - sand, shales, organics
- Upper Devonian, Catskill Formation burial depths 5-6 km or 3-4 miles
- Deepest burial 290 to 270 My, placing organics in these rocks in the gas window
- Roughly 98% of any oil remaining at this time was cracked to gas
- Gas expelled from the Upper Devonian source rocks migrated and accumulated in the sandstones of the Catskill and Lock Haven Formations from about 270 to 240 My during deepest burial and initial uplift
- Successive uplift, orogenic events and glaciation removed the younger overburden exposing the Upper Devonian rocks at the surface in Susquehanna County and northeast Pennsylvania or ***exhumed this giant gas reservoir***

"shallow gas at or near surface – in northeastern Pennsylvania"



(Modified from Laughrey et al., 2004, Fig. 1A and 15)
BC Brace Creek; CR Council Run Field; BR Black Moshannon; Oil and gas fields .

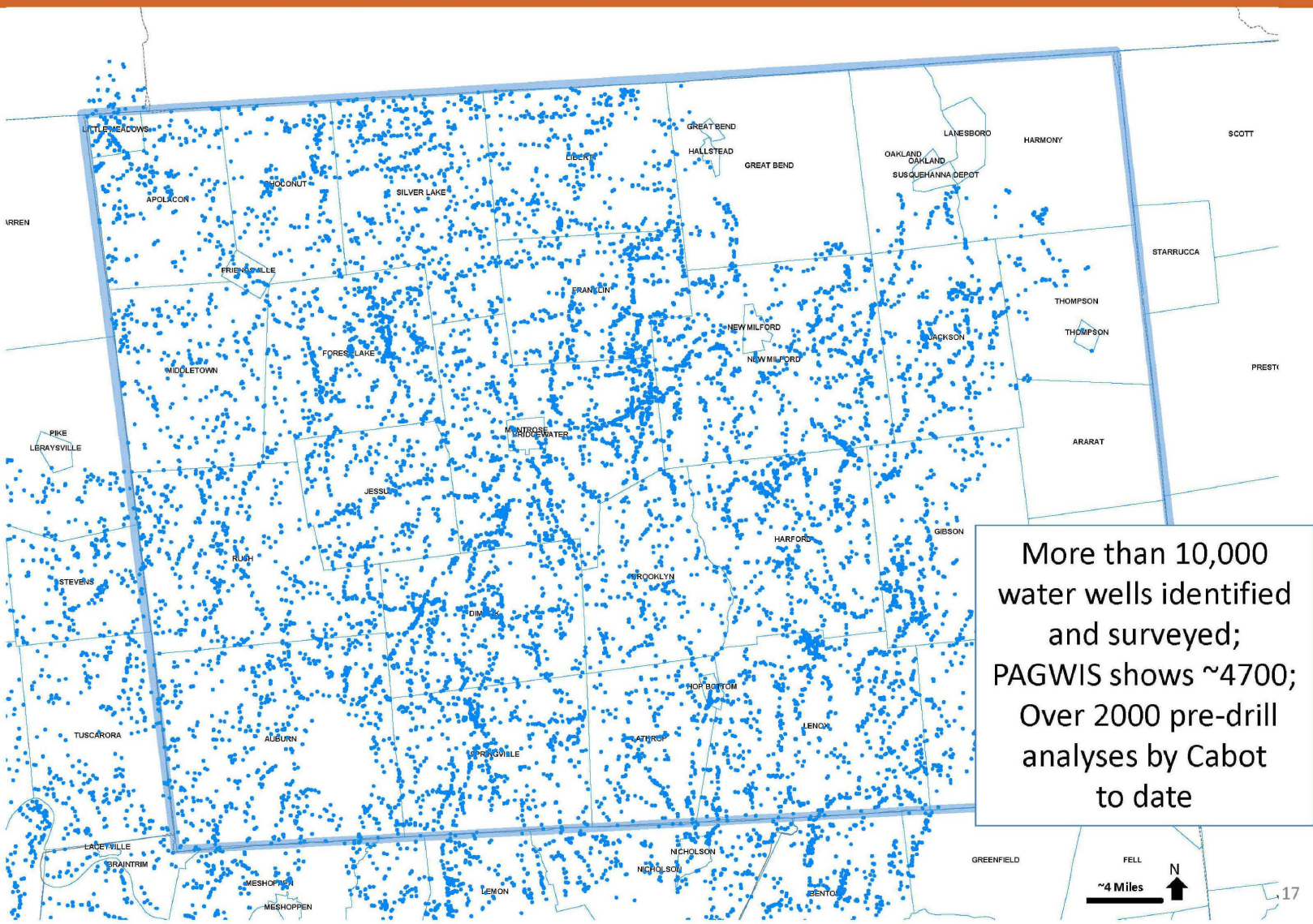


Upper Devonian Organic Material abundant and source of Stray Gas

Catskill Formation

Water wells and gas wells penetrate this organic material and encounter associated stray gas found in the sandstones and siltstones of the Catskill Formation in Susquehanna County

Water Wells Identified - Susquehanna County



More than 10,000 water wells identified and surveyed; PAGWIS shows ~4700; Over 2000 pre-drill analyses by Cabot to date

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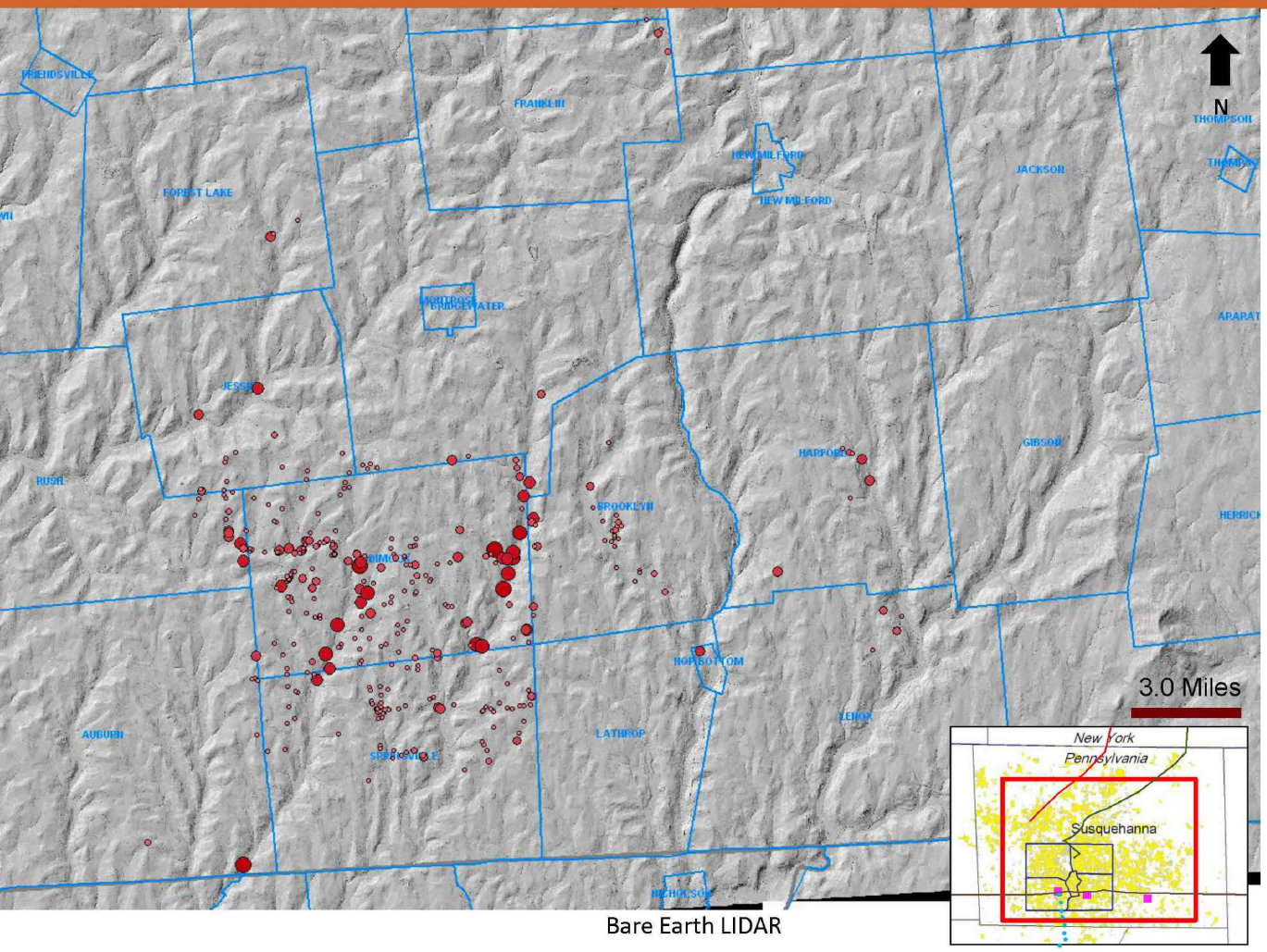
DIM0038454

Pre-Drill Methane Susquehanna County, PA - 2010



Bare Earth LIDAR

Legend

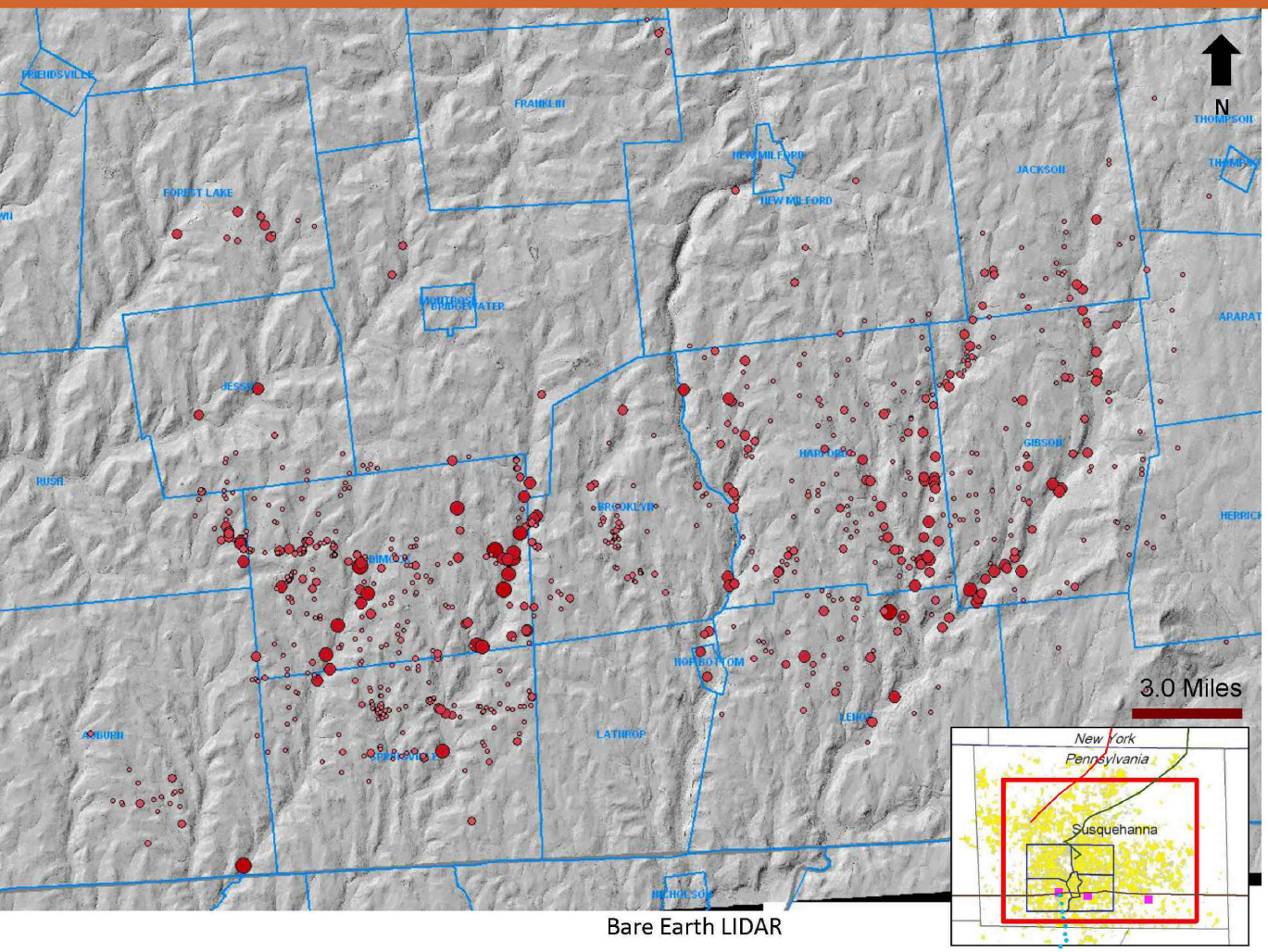
Pre-Drill Methane (mg/L)

- 0.010 – 0.025
- 0.025 – 0.050
- 0.050 – 0.100
- 0.1 – 0.5
- 0.5 – 1
- 1 – 5
- 5 – 10
- 10 – 15
- 15 – 20
- 20 – 25
- 25 – 30
- 35 – 40
- 45 – 50

Bare Earth LIDAR is a depiction of Topography, with vegetation removed

Observation: "prevalence of higher stray methane in valleys"

Pre-Drill Methane Susquehanna County, PA – cont'd



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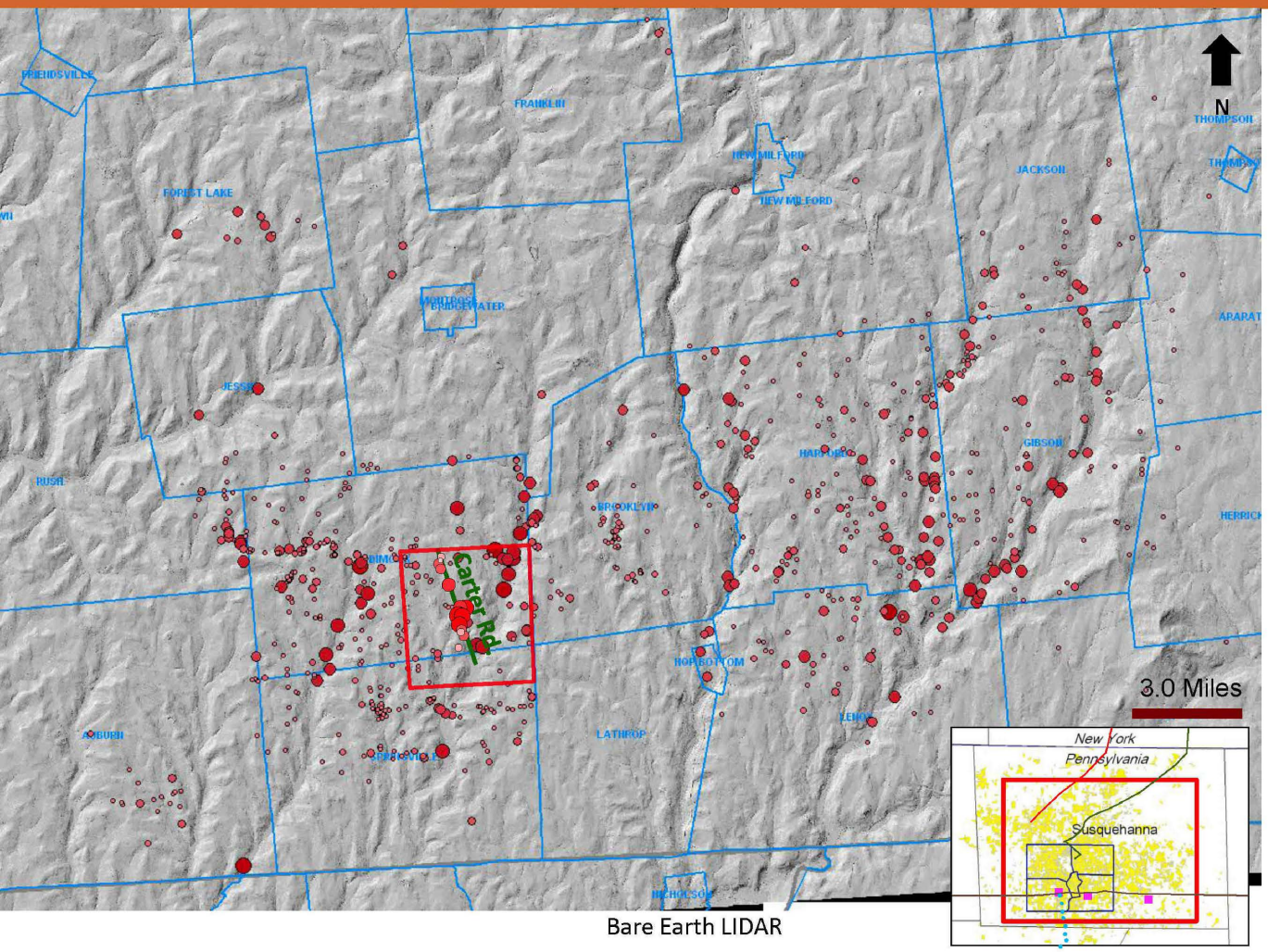
- 25 – 30
- 35 – 40
- 45 – 50

Bare Earth LIDAR

Upper Devonian rocks charged with stray methane at or near surface – this is background.

Pre-Drill Methane Susquehanna County, PA – cont'd



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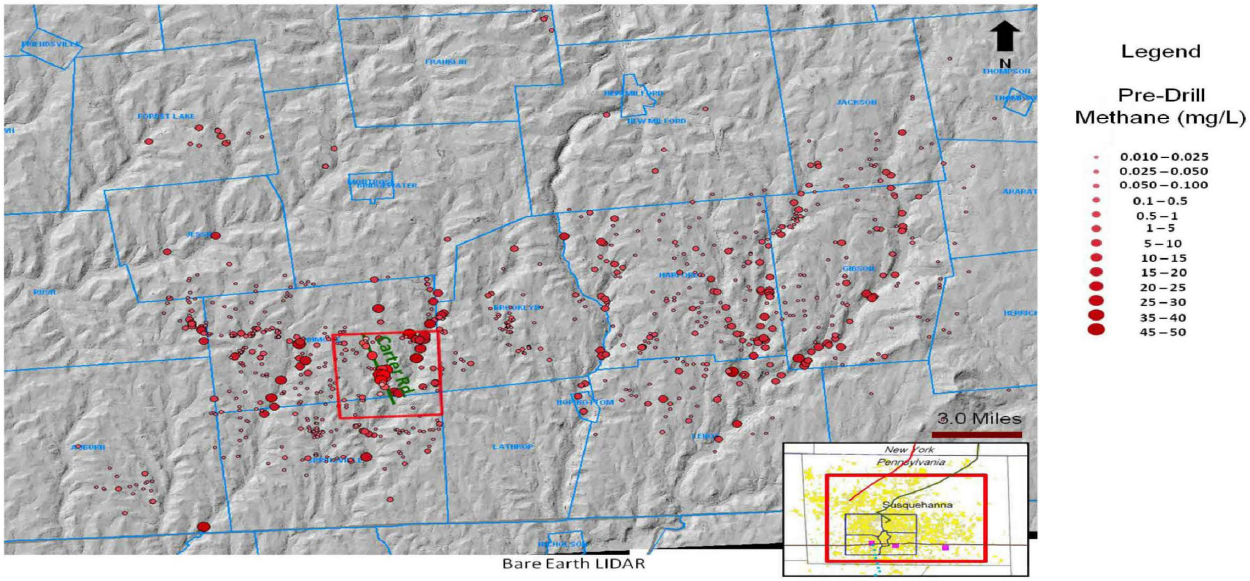
Bare Earth LIDAR

Upper Devonian rocks charged with stray methane at or near surface – this is background.

Water well measurements/sampling in undrilled areas

- Data taken from hundreds of water wells – pre-drill
- Data taken from 60 square mile, undrilled, study area (Brooklyn, Harford, Gibson, and other townships)
- Data now includes more than 2000 pre-drill samples
- 80% of water wells have pre-existing methane
- Geographic distribution and patterns of elevated background methane measurements are statistically equivalent to methane concentrations within the CO&SA area



Water Well Summary

18 Water Wells - Status

- Group A (12 water wells) *
  - Methane below 7 mg/L or 5 mg/L with treatment system installed
- Group B (1 water well) *
  - Biogenic gas
- Group C (2 water wells) **
  - Refused treatment system
- Group D (3 water wells) **
  - Residents refused water sampling for all of 2011
  - Treatment system declined

* Finding sought from DEP of compliance

** Sampling will continue on water wells that require additional data to support the eight quarters sampling requirement

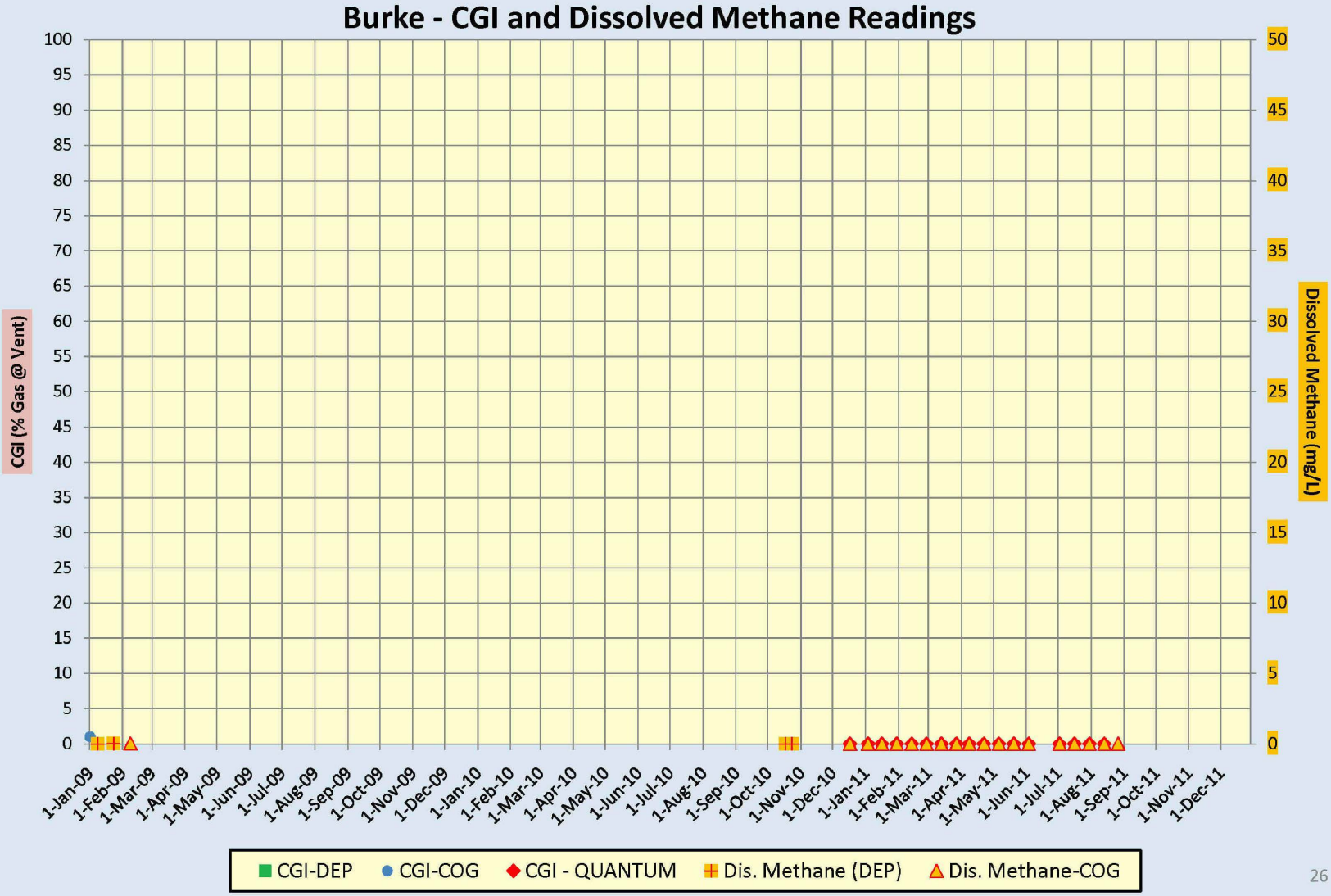
Group A (12 water wells)

Methane below 7 mg/L or 5 mg/L with treatment system installed

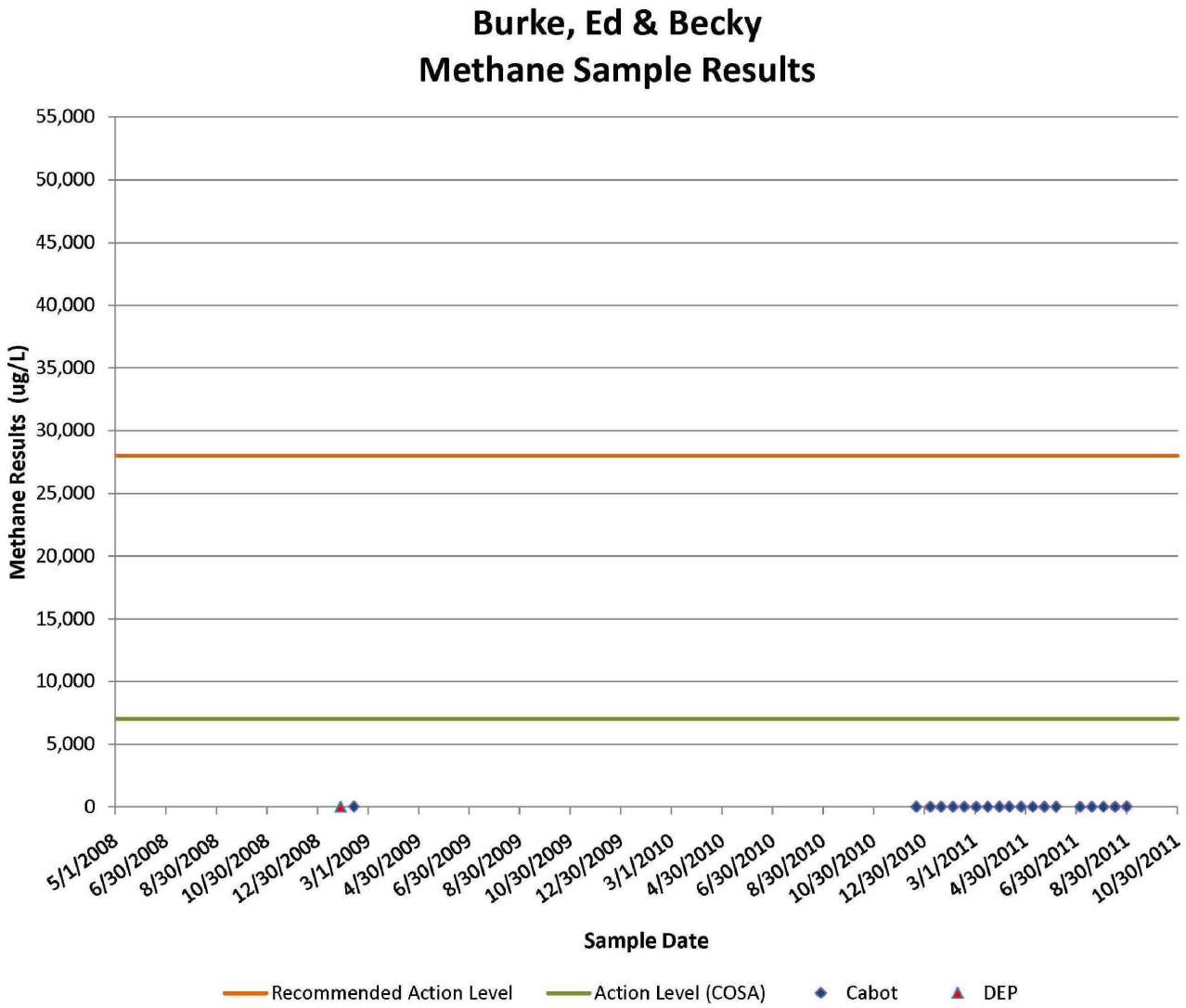
Burke, Ed and Becky – Water Well Summary

Water Well - Owner	Ed and Becky Burke
Exceed Primary:	Total and Fecal Coliform
Exceed Secondary:	pH
Dissolved Gas:	Most Recent Result = 0.014 mg/L (8/31/2011)
Before Treatment:	Data not yet available
After Treatment:	Data not yet available
	System installed July 2011.
Gas Wells ≤ 1000':	None
Gas Wells 1000' - 2500':	Baker 1V - P&A Baker 3H Hubbard 1V Hubbard 5H Hubbard 6H
Plan Forward:	Continue to monitor as per CO&SA.
Comments:	Received escrow funds. Installed treatment system.

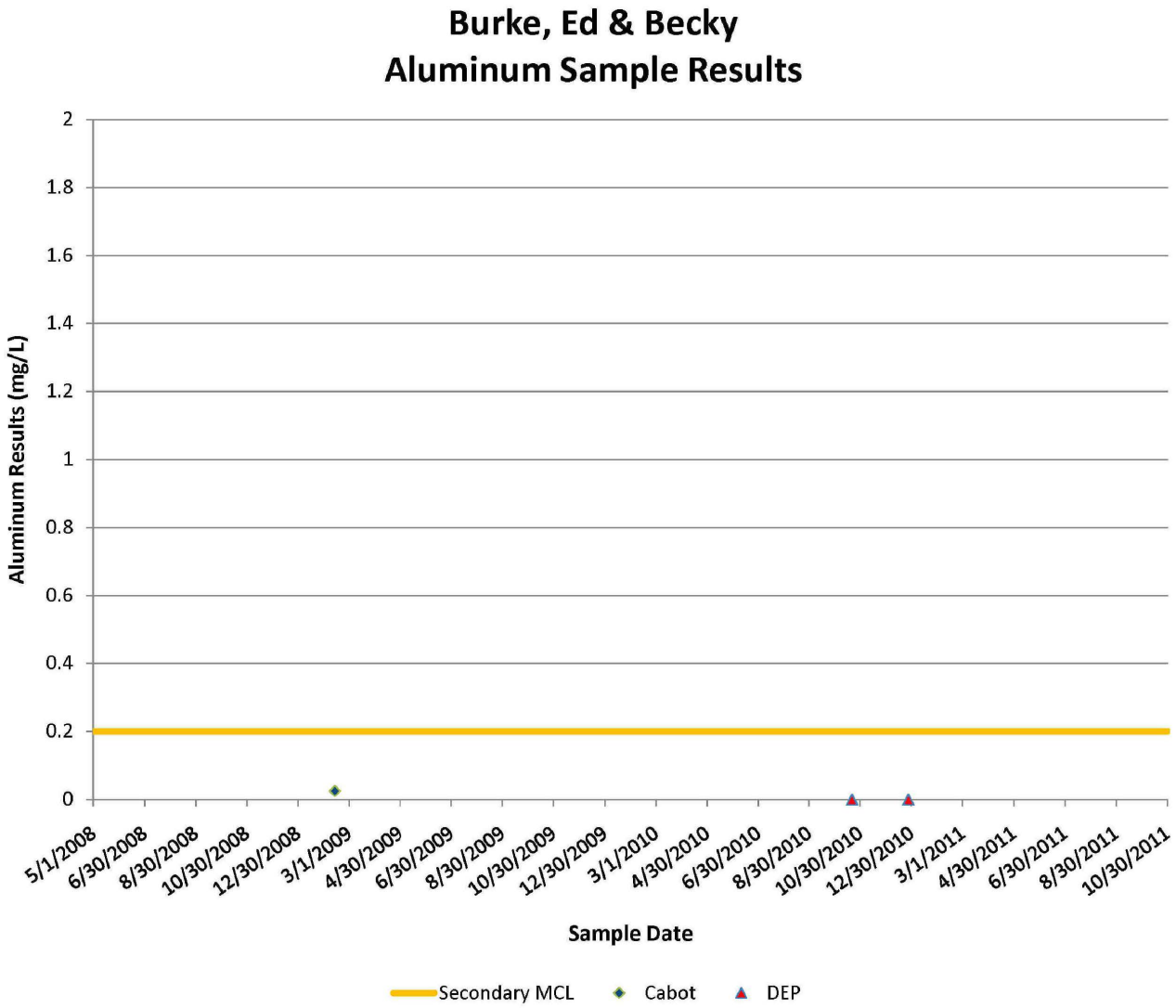
Burke, Ed and Becky – CGI and Dissolved Methane Graphs



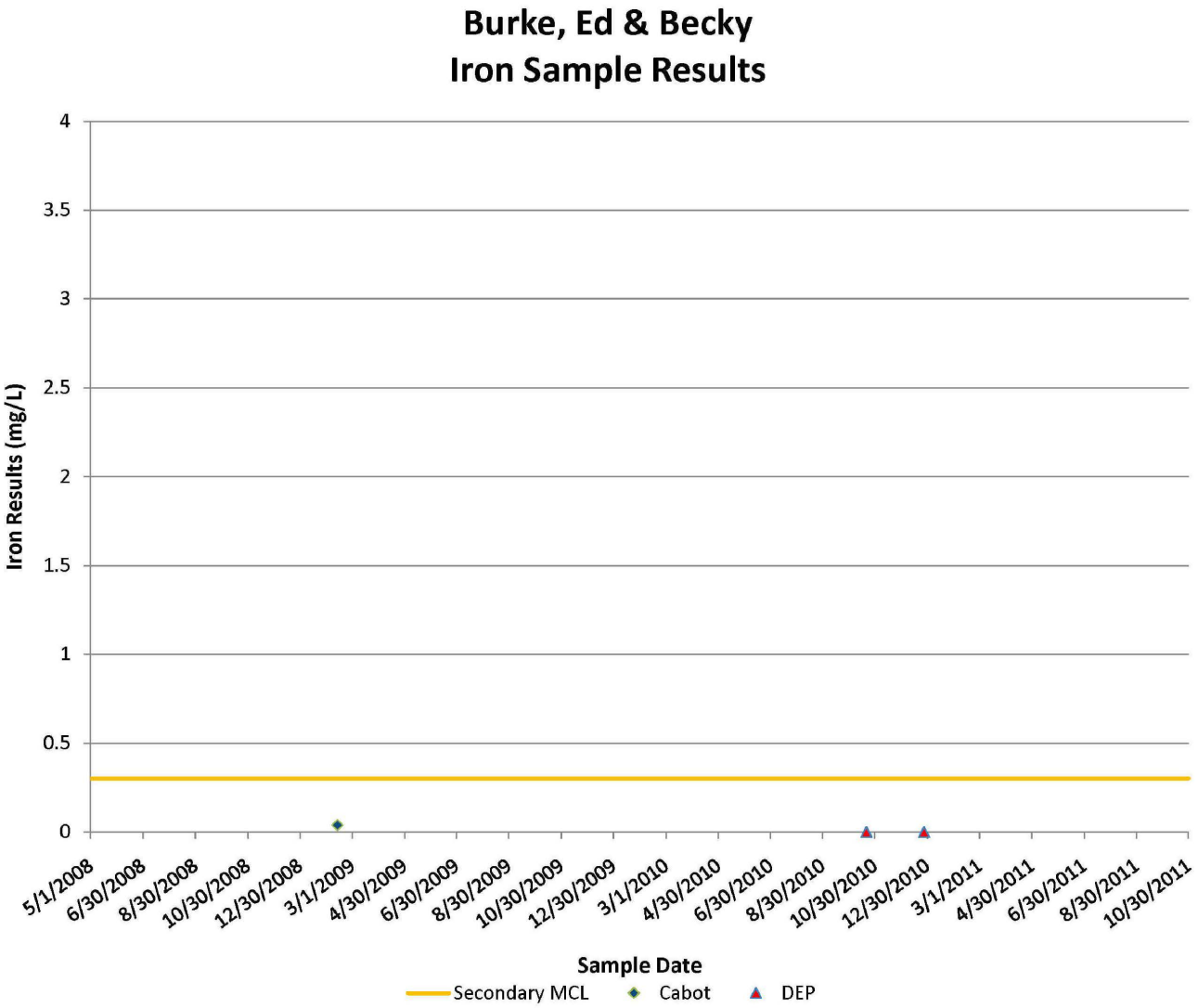
Burke, Ed and Becky – CH4 results



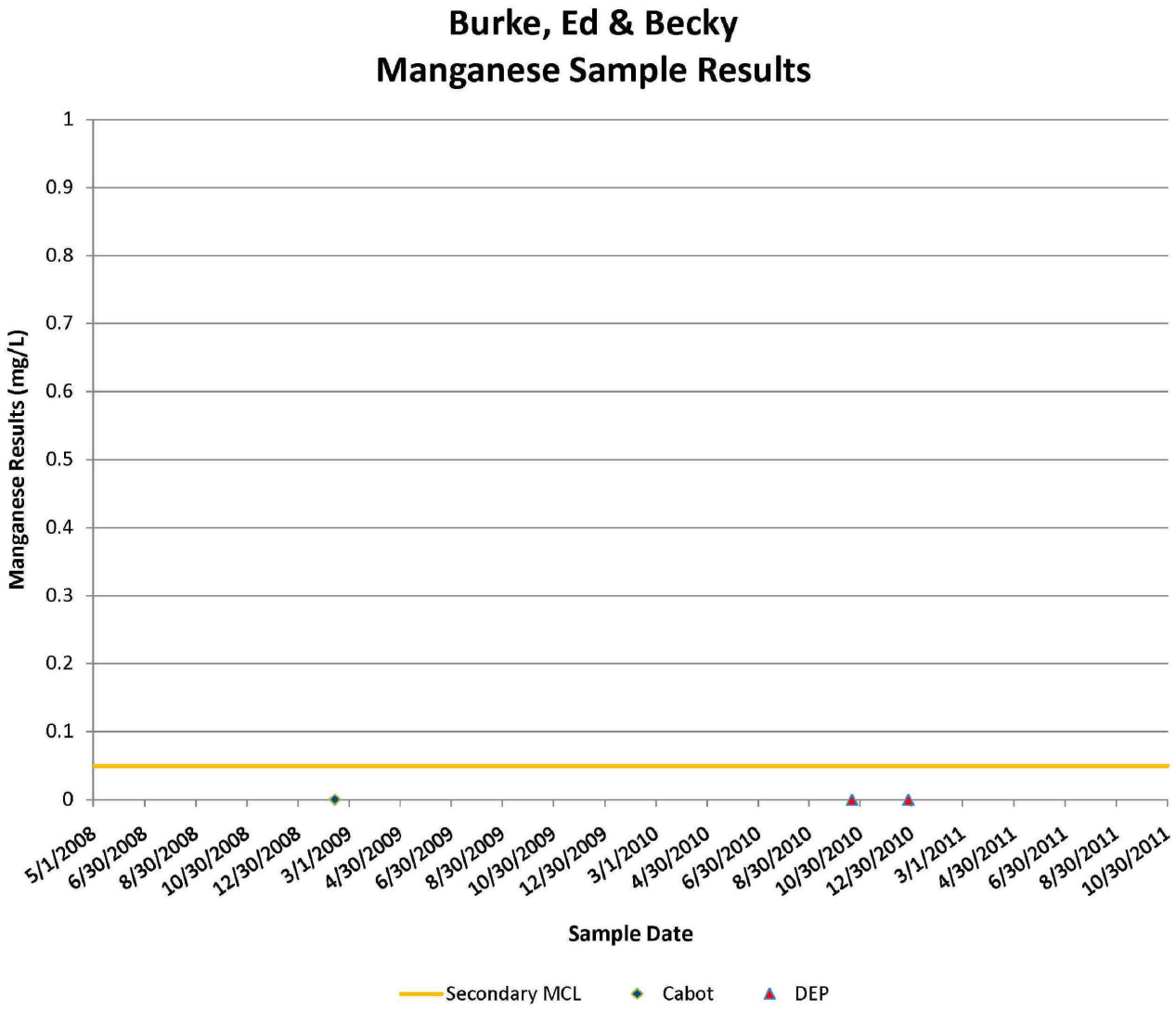
Burke, Ed and Becky – Al results



Burke, Ed and Becky – Fe results



Burke, Ed and Becky – Mn results



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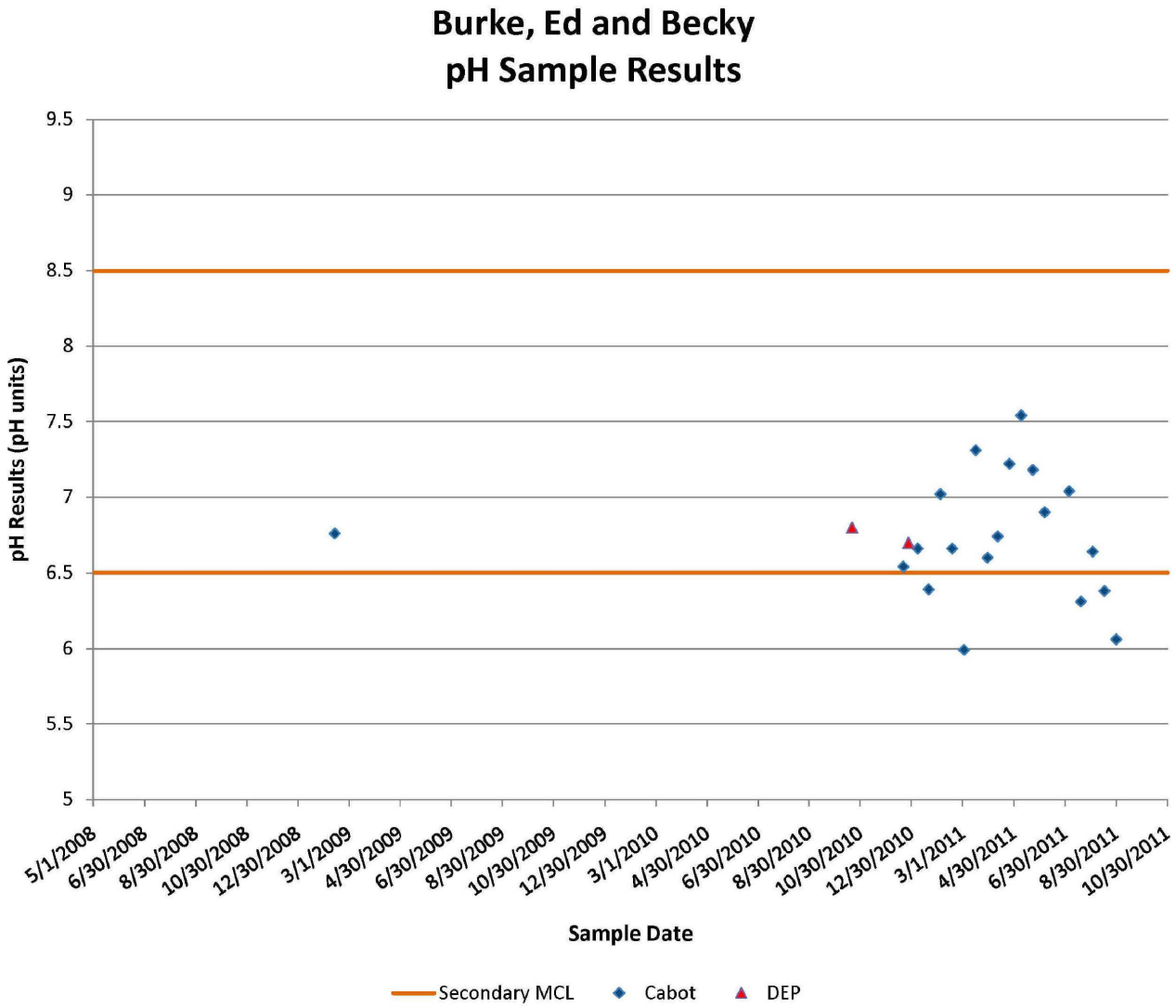
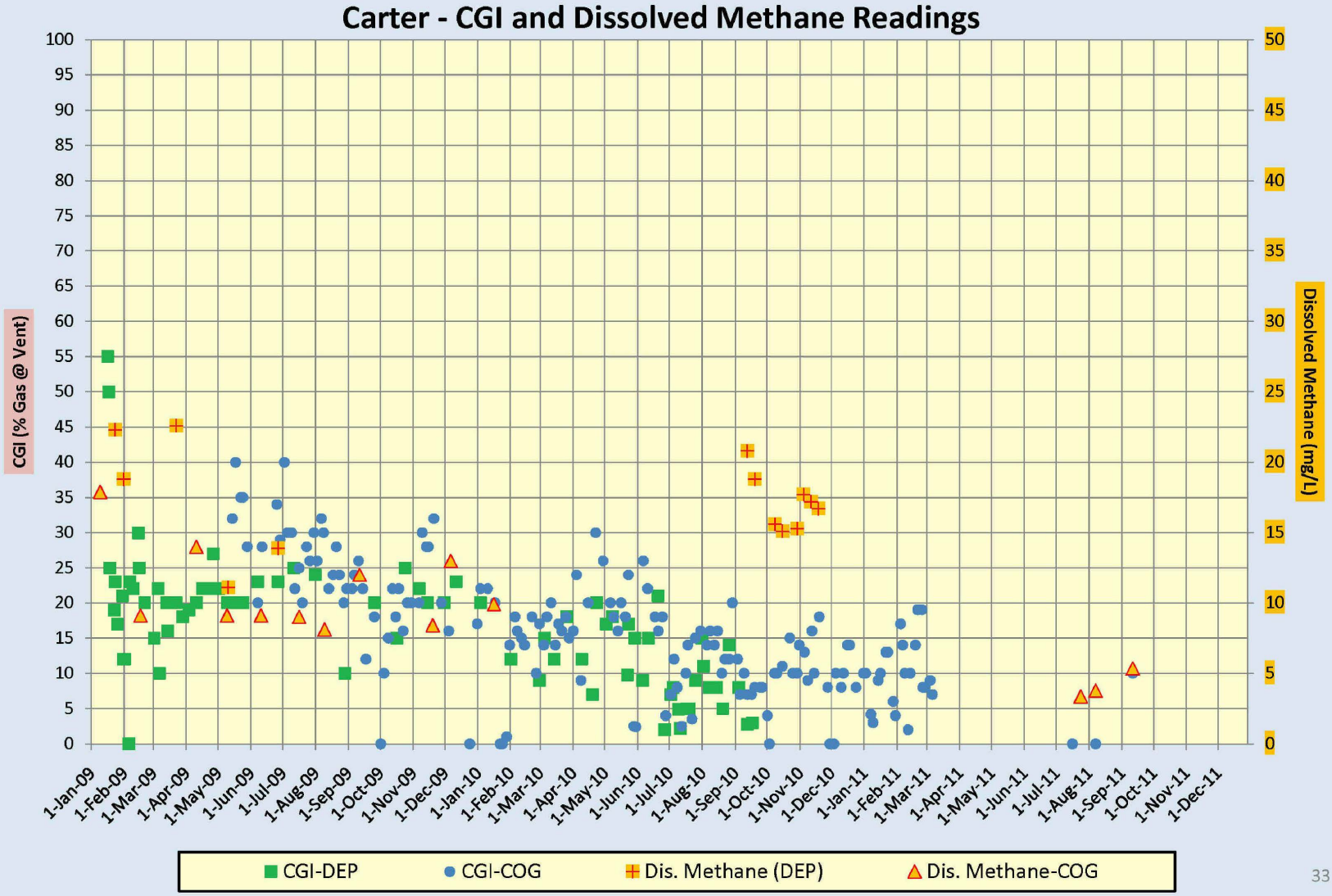


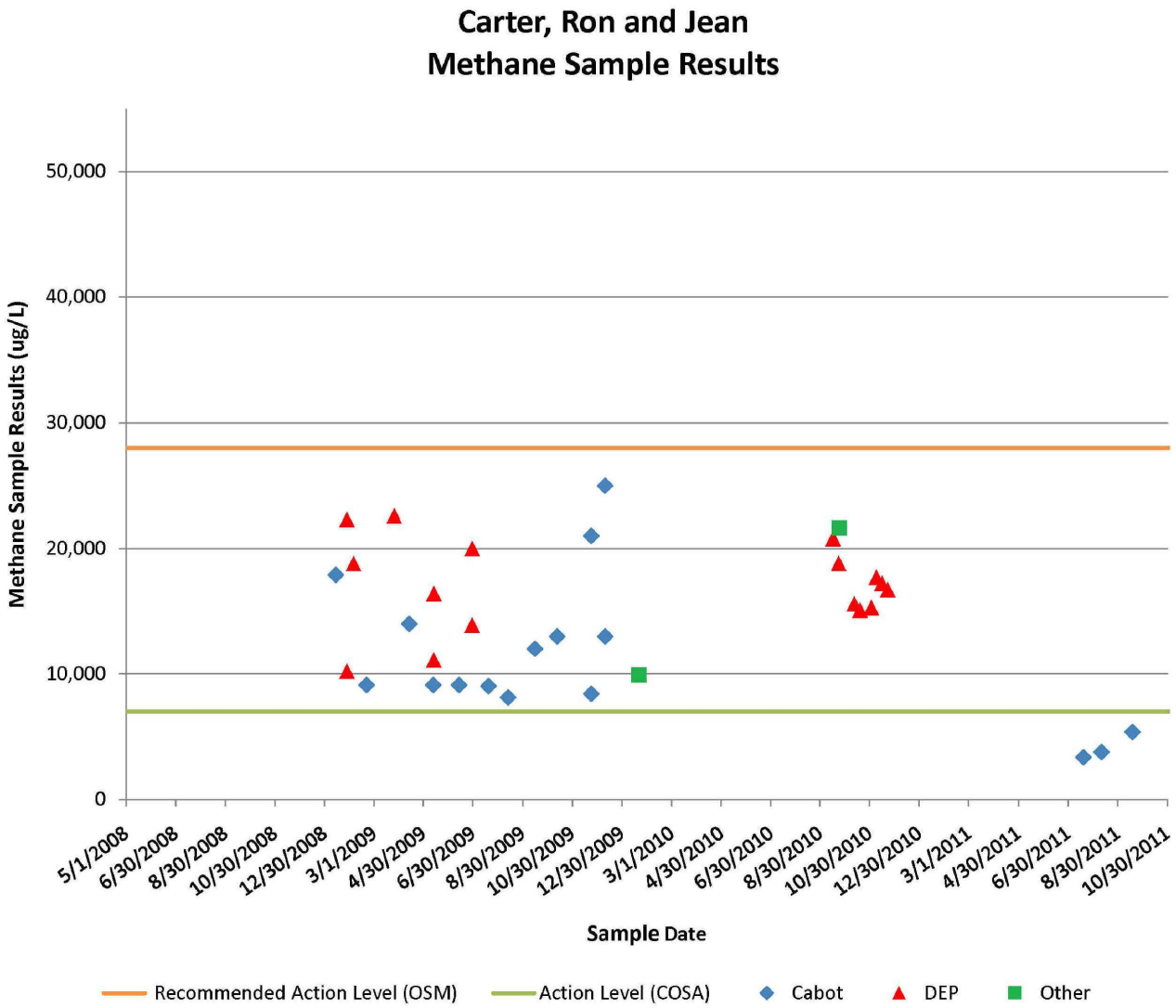
Carter, Ron Sr. and Jean– Water Well Summary

Water Well - Owner	Ron Sr. and Jean Carter
Exceed Primary:	None
Exceed Secondary:	Aluminum pH
Dissolved Gas:	Most Recent Result = 5.35 mg/L (9/15/2011)
Before Treatment:	N/A
After Treatment:	N/A
Gas Wells ≤ 1000':	Gesford 2V Gesford 7H
Gas Wells 1000' - 2500':	Gesford 1V Gesford 5H Baker 3H Baker 1V - P&A Gesford 3 – P&A Gesford 9 – P&A
Plan Forward:	Continue to monitor as per CO&SA. Offer treatment system.
Comments:	Receiving bottled and bulk water. Refusing treatment system.

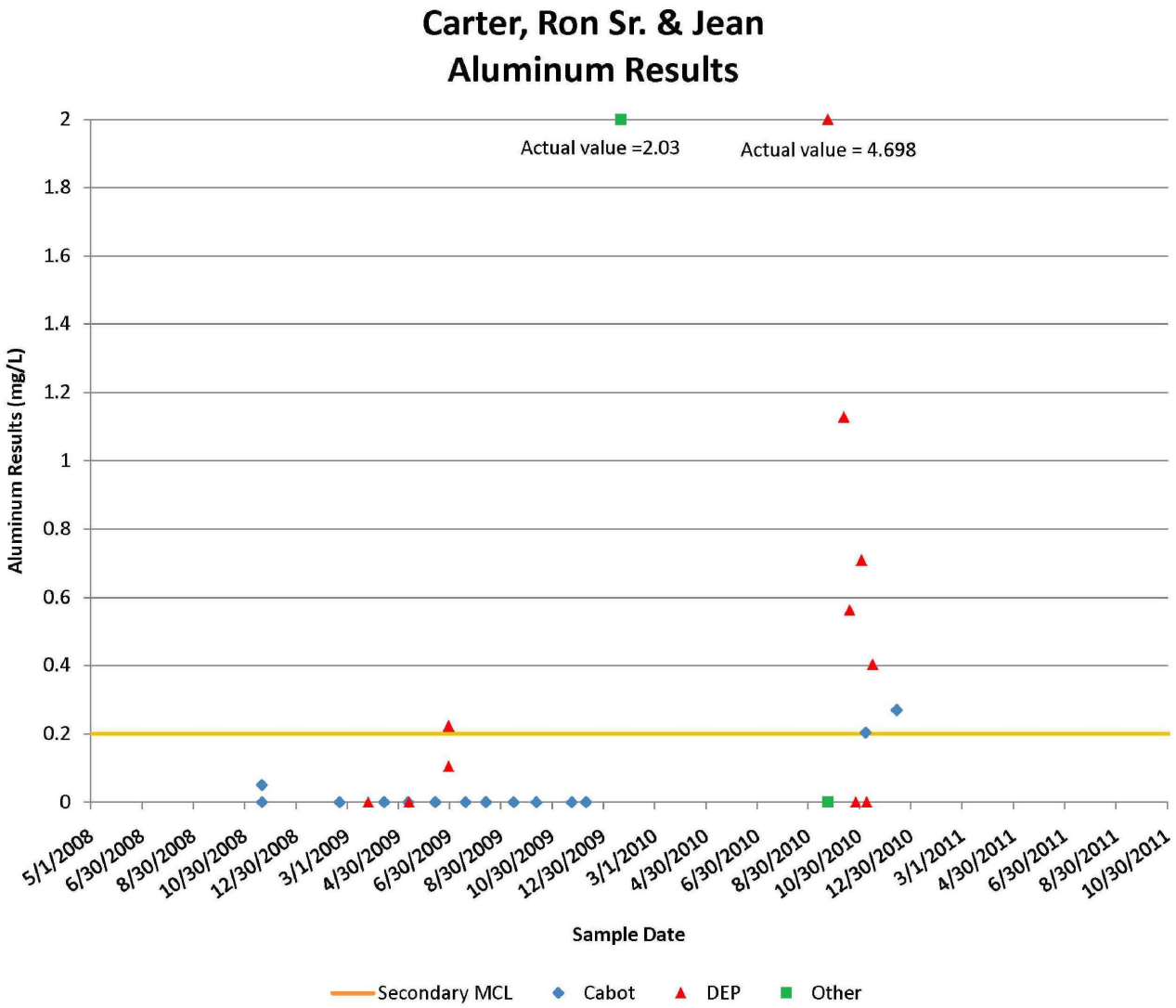
Carter – CGI and Dissolved Methane Graphs



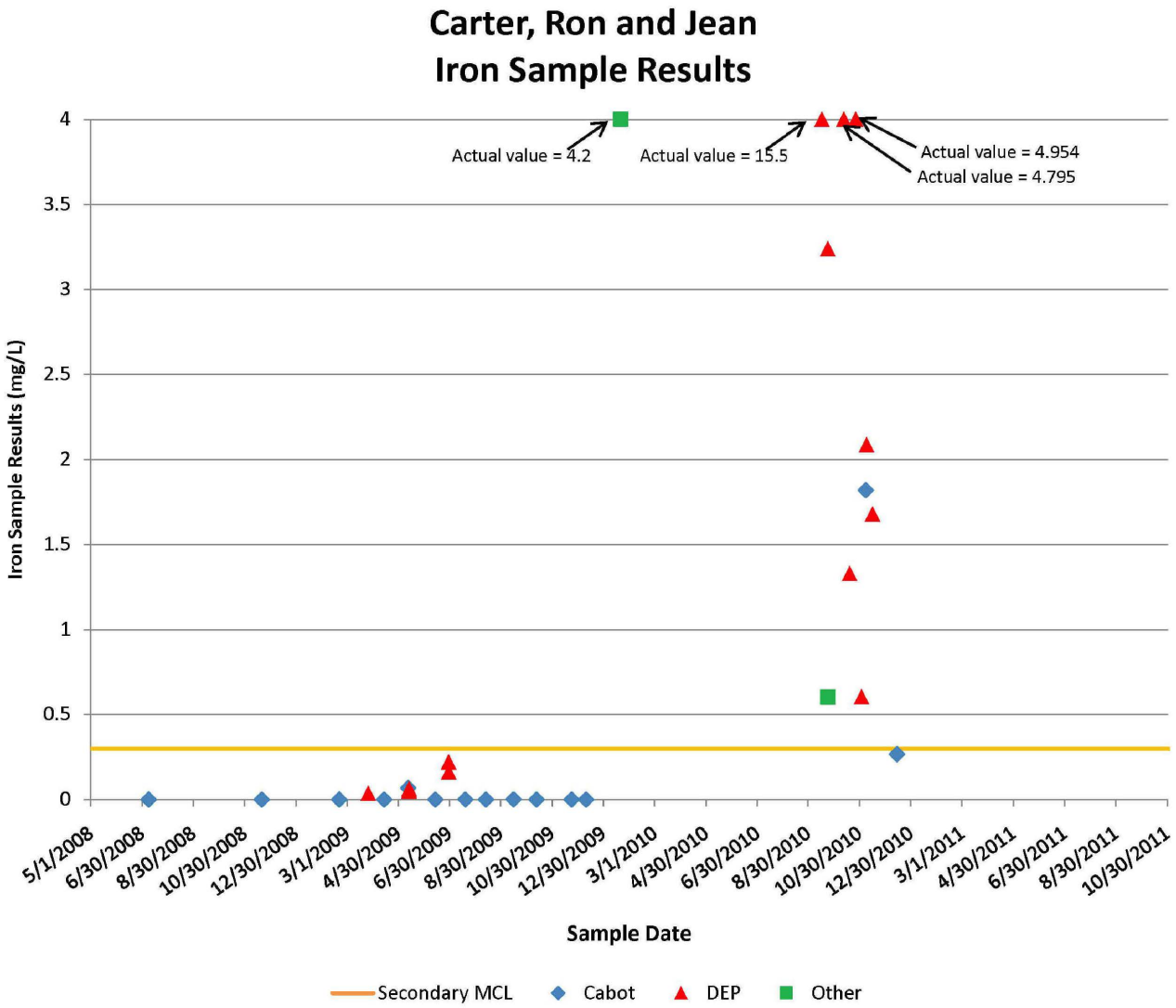
Carter, Ron Sr. and Jean – CH4 results



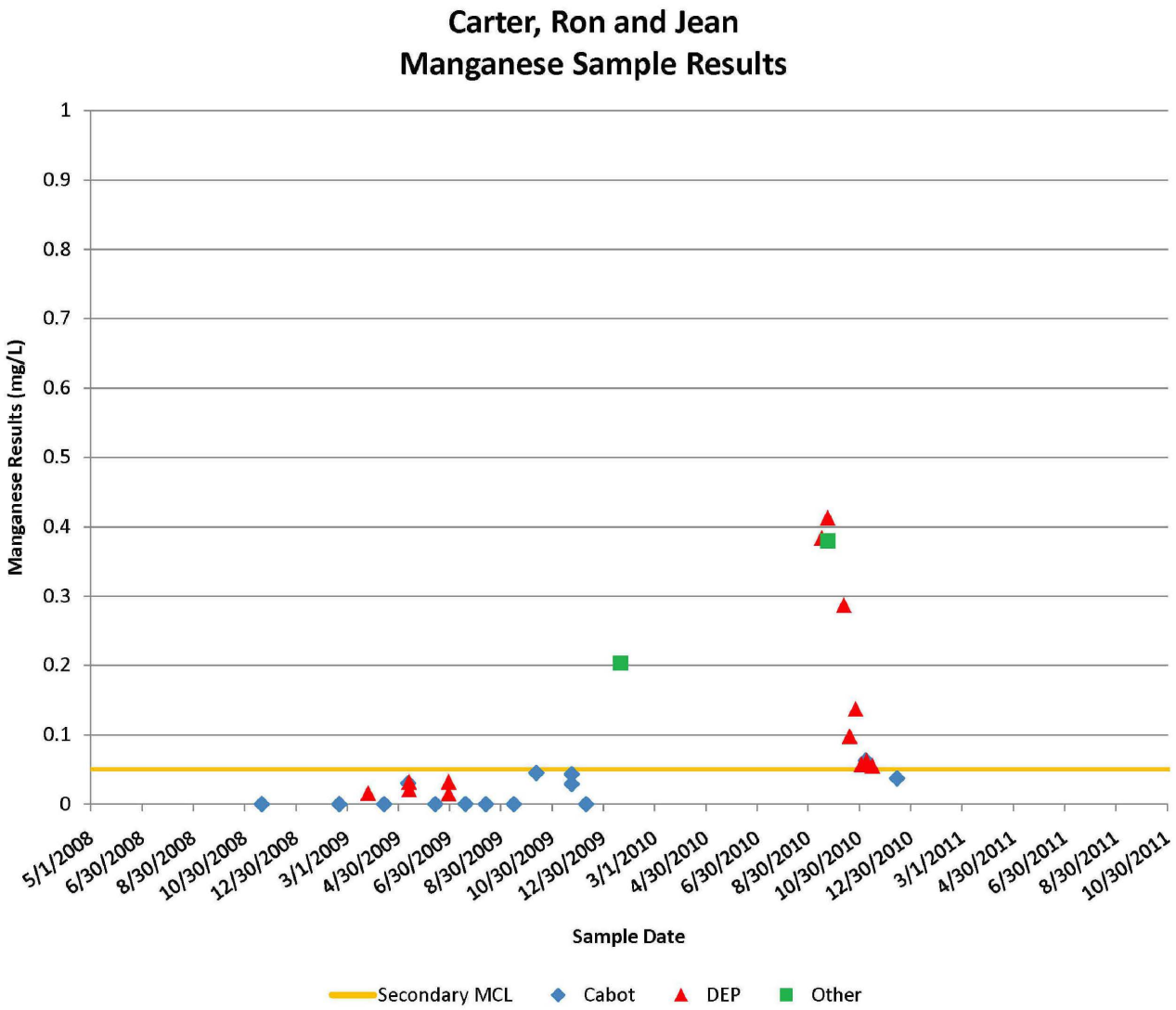
Carter, Ron Sr. and Jean – Al results



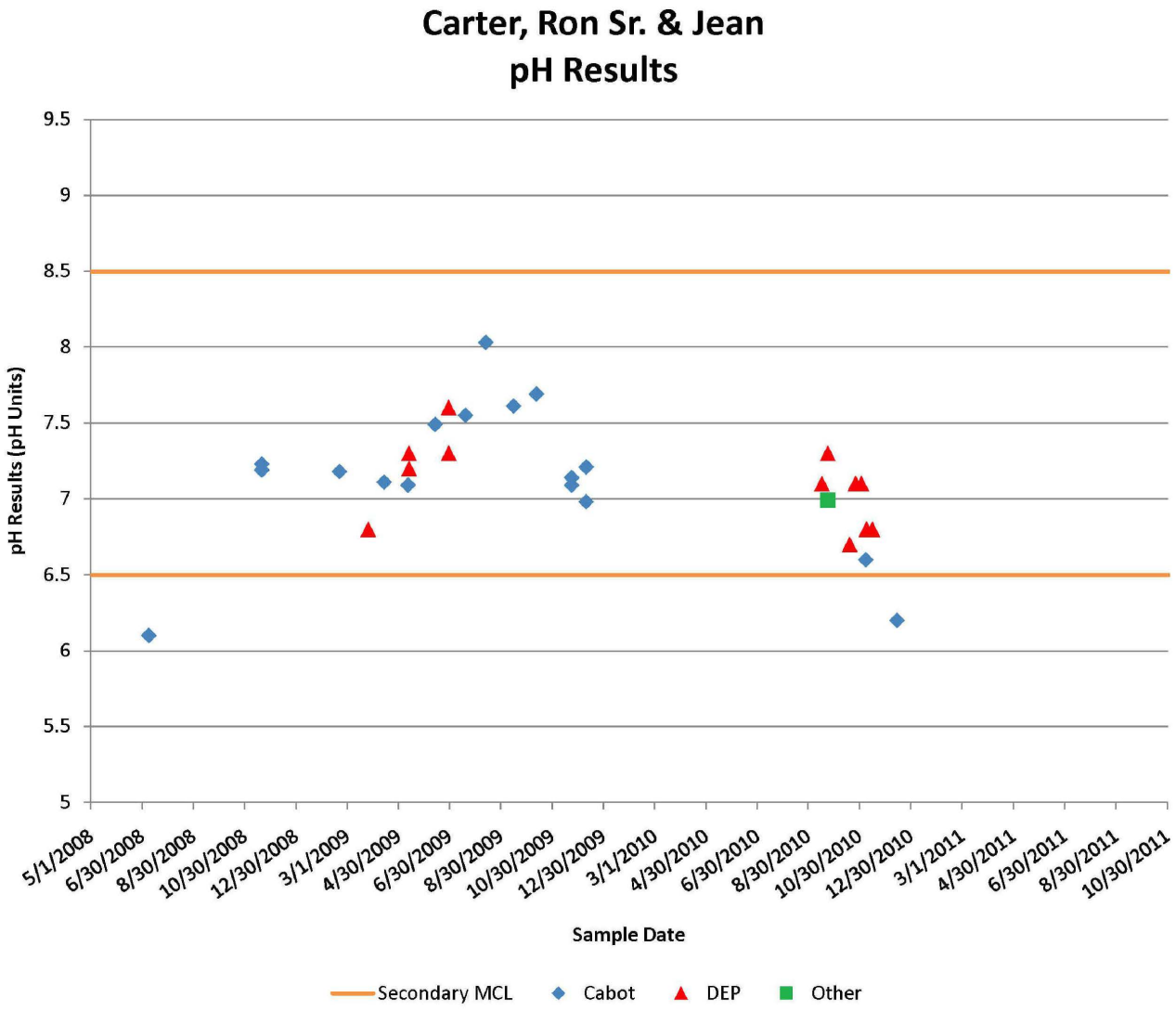
Carter, Ron Sr. and Jean – Fe results



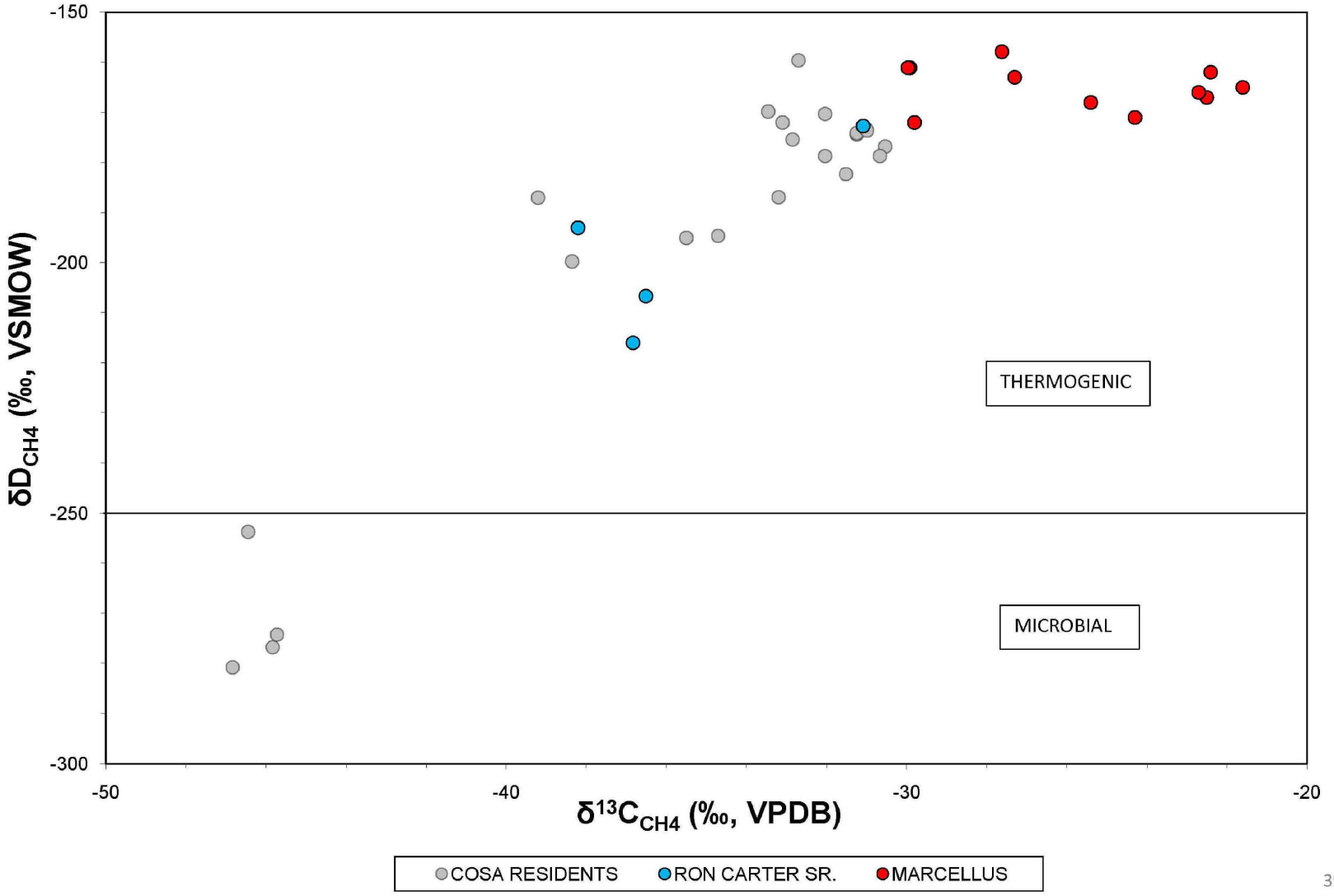
Carter, Ron Sr. and Jean – Mn results



Carter, Ron Sr. and Jean – pH results



Carter, Ron Sr. and Jean – Isotopes



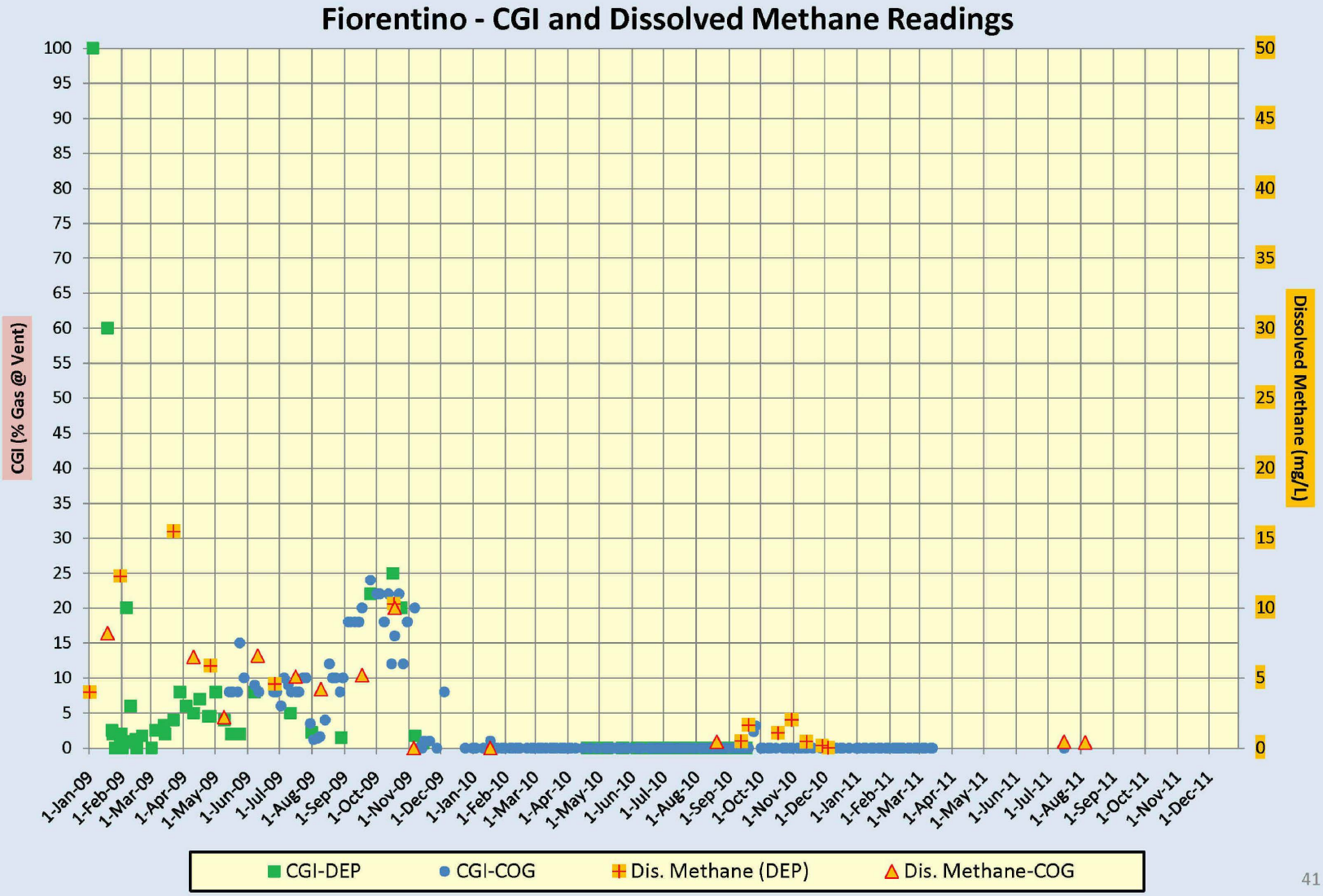
DIM0038437

DIM0038476

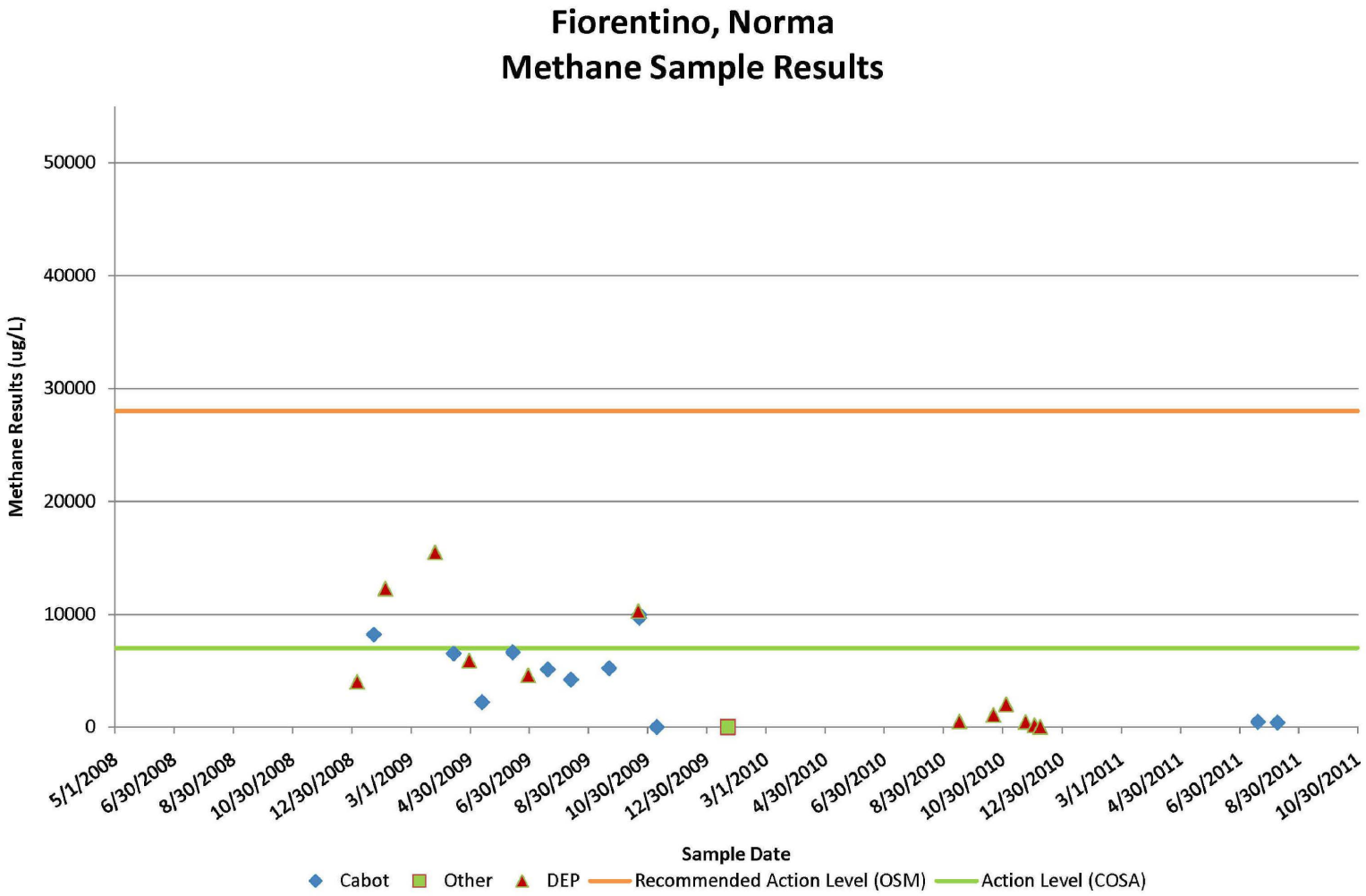
Fiorentino, Norma – Water Well Summary

Water Well - Owner	Norma J. Fiorentino
Exceed Primary:	None
Exceed Secondary:	Iron Manganese
Dissolved Gas:	Most Recent Result = 0.457 mg/L (8/24/2011)
Before Treatment:	N/A
After Treatment:	N/A
Gas Wells ≤ 1000':	None
Gas Wells 1000' - 2500':	Hubbard 1V Hubbard 5H Hubbard 6H Baker 3H Baker 1V - P&A
Plan Forward:	Continue to monitor as per CO&SA. Offer treatment system.
Comments:	Receiving bottled and bulk water. Refused treatment system.

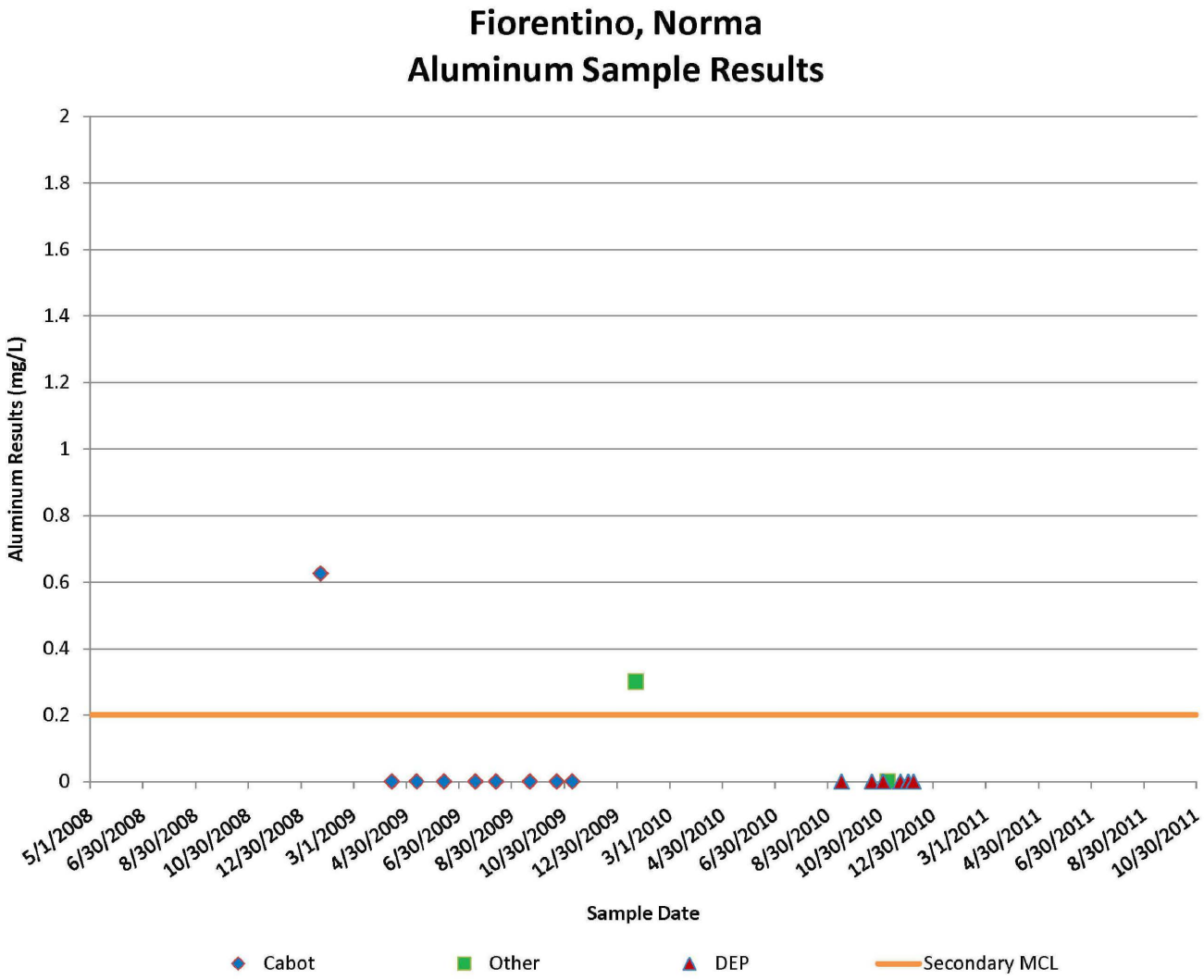
Fiorentino – CGI and Dissolved Methane Graphs



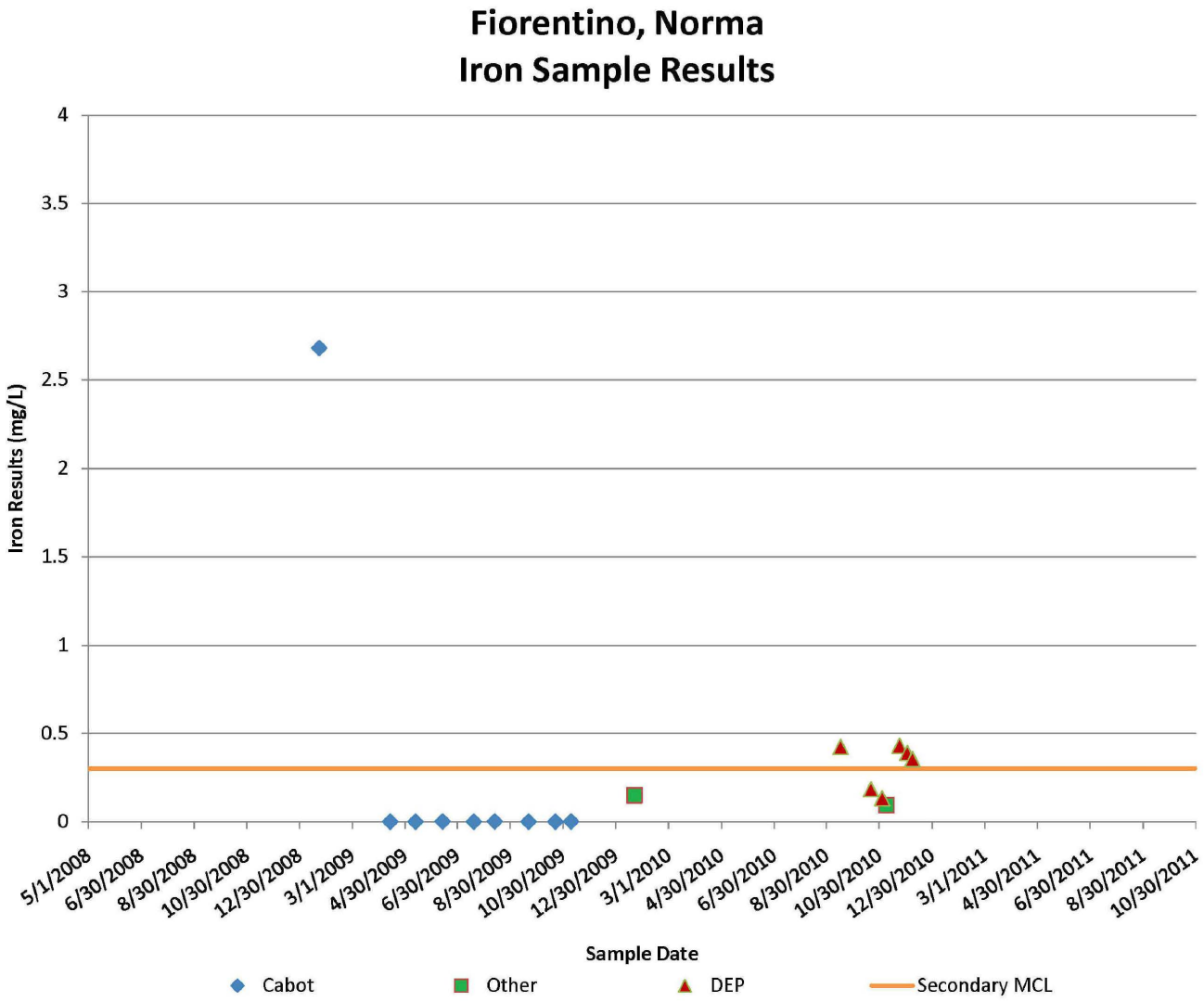
Fiorentino, Norma – CH4 results



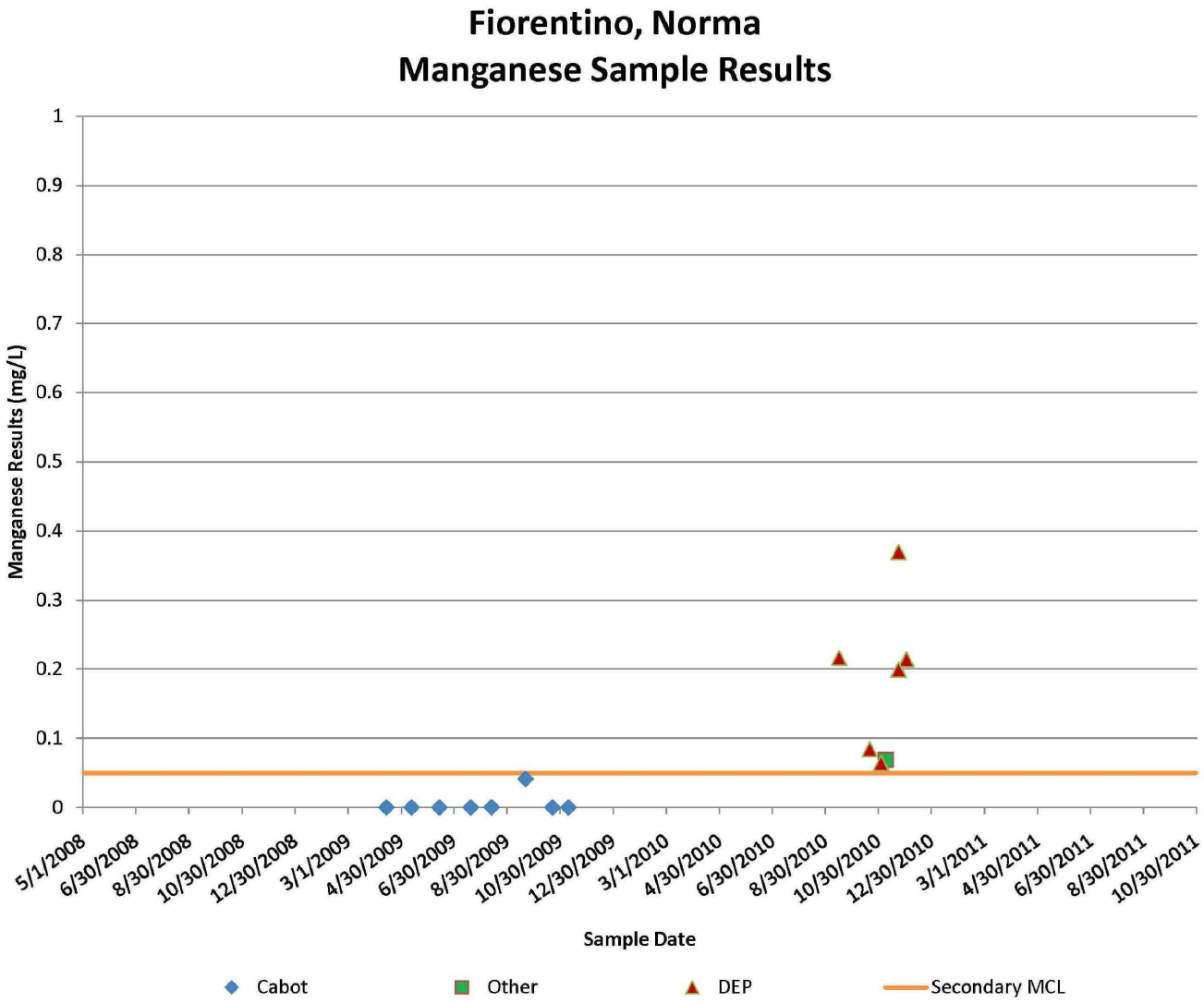
Fiorentino, Norma – Al results



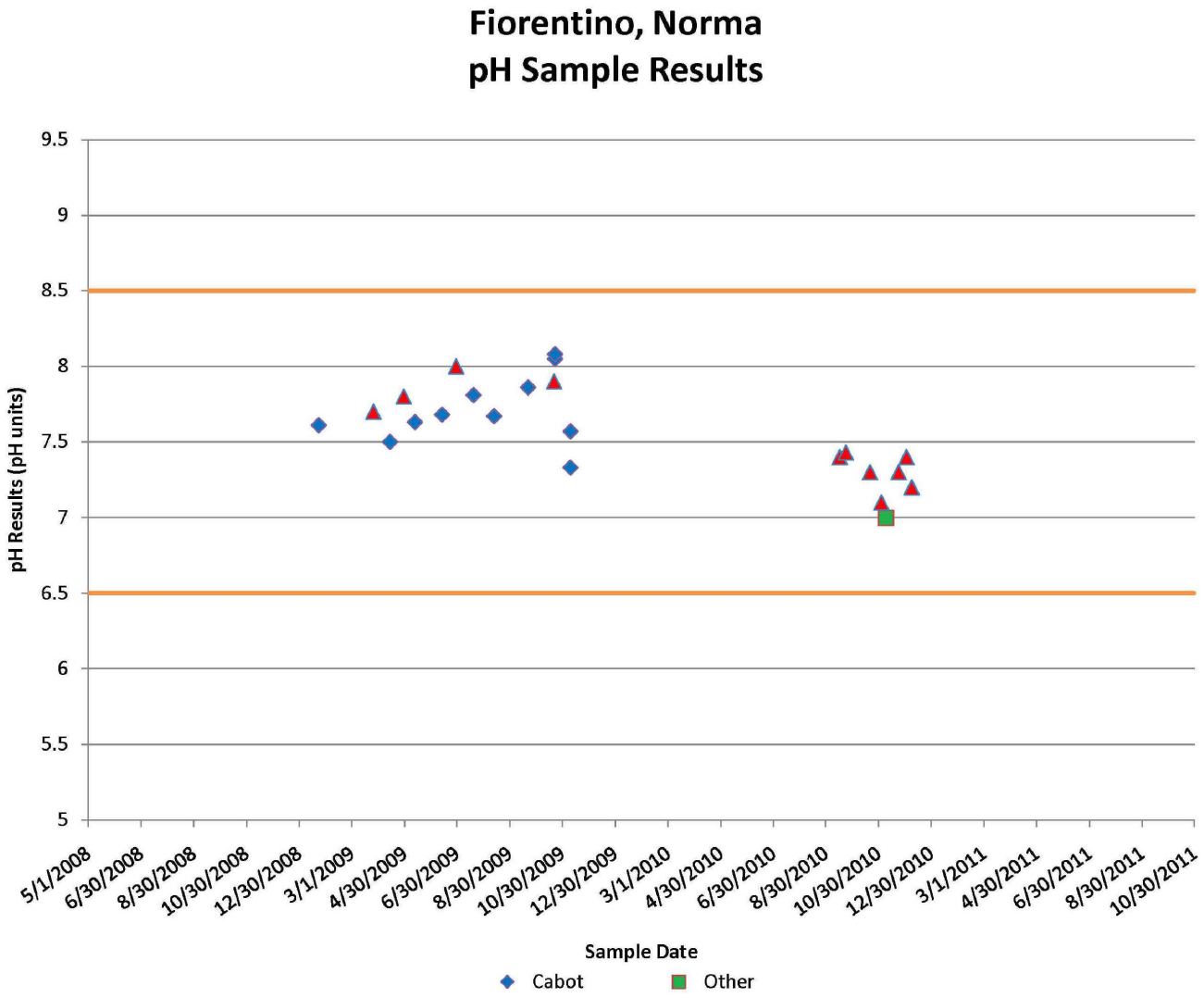
Fiorentino, Norma – Fe results



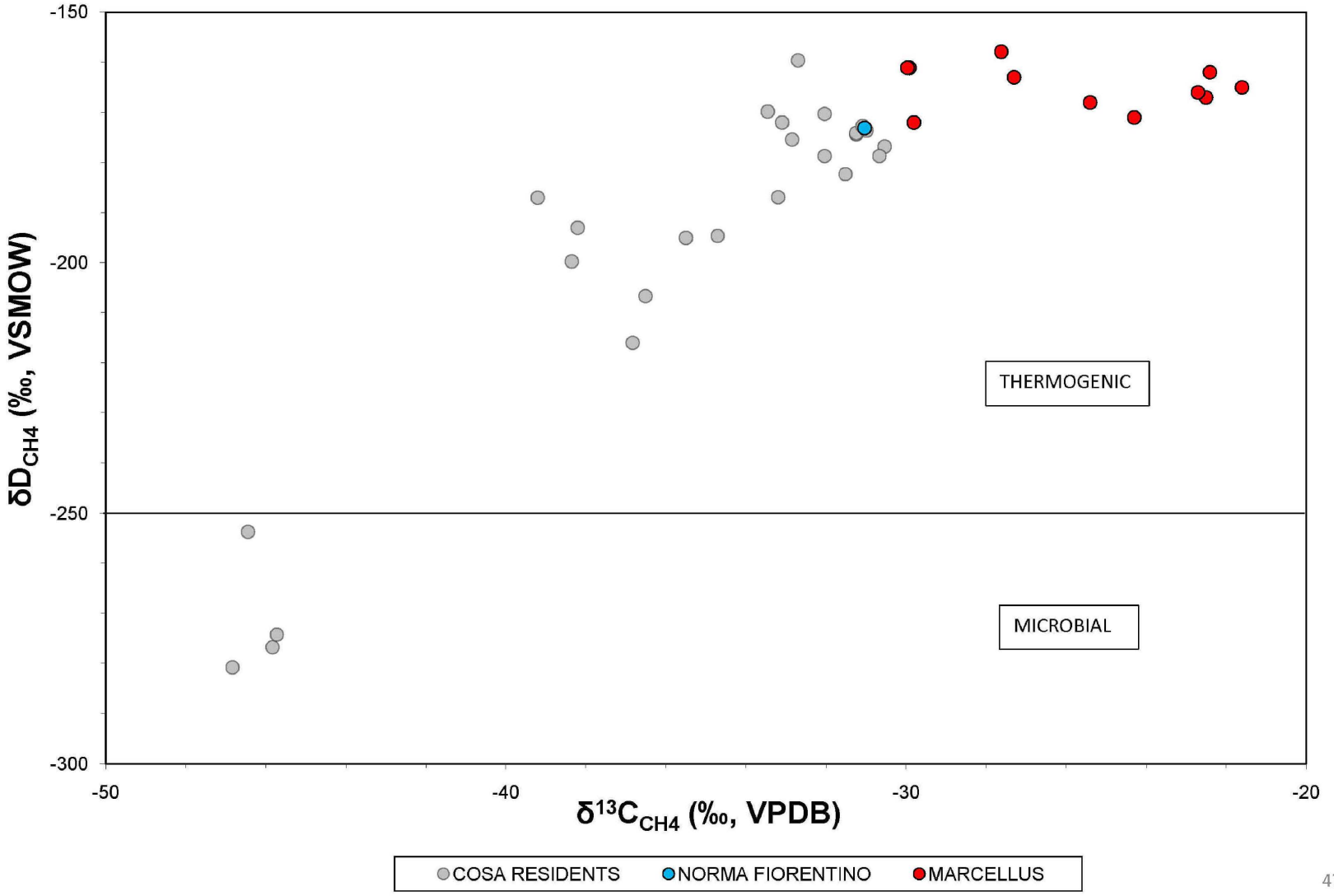
Fiorentino, Norma – Mn results



Fiorentino, Norma – pH results



Fiorentino, Norma – Isotopes



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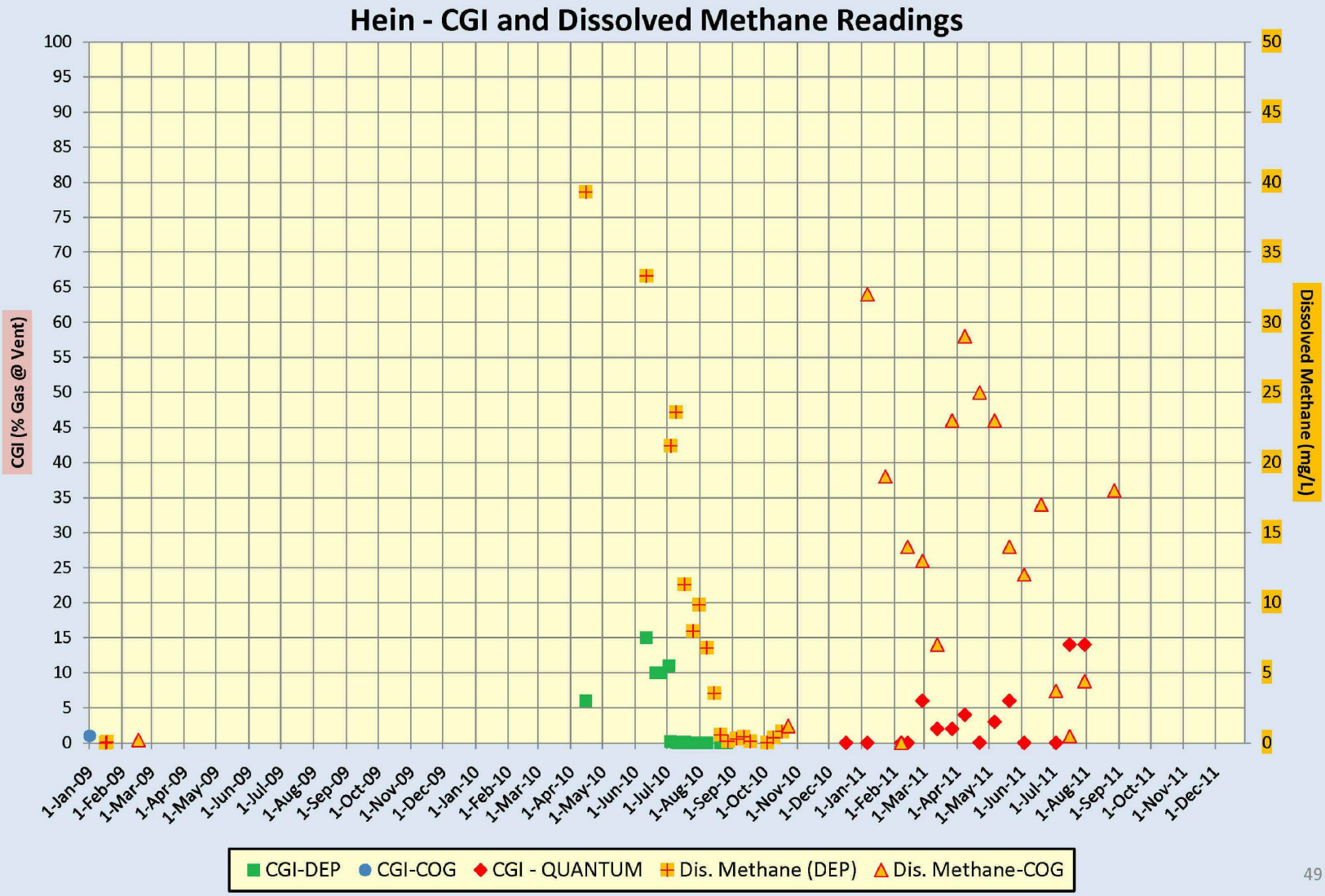
DIM0038484

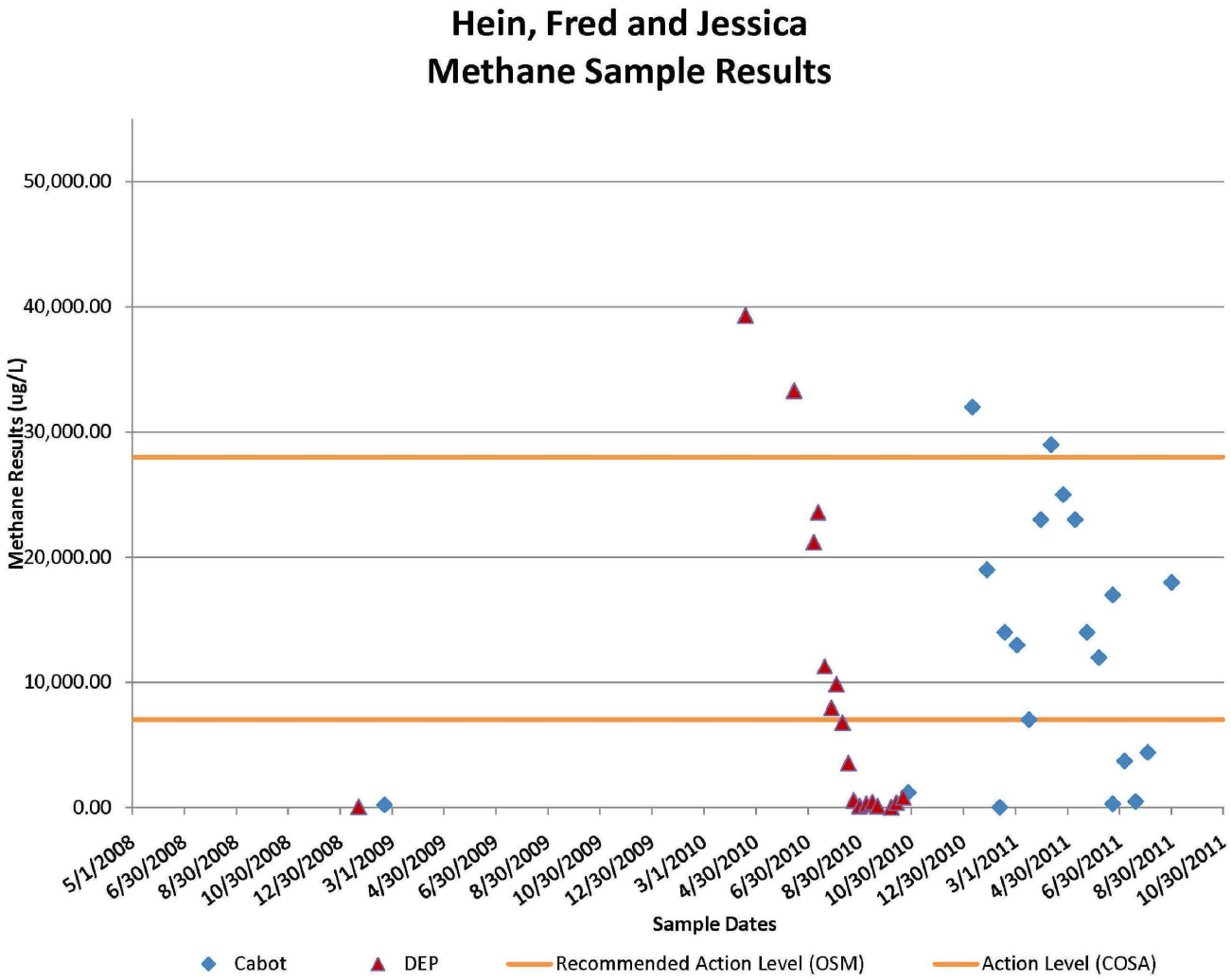
Hein, Frederick and Jessica – Water Well Summary

Water Well - Owner	Frederick and Jessica Hein
Exceed Primary:	None
Exceed Secondary:	Manganese
Dissolved Gas:	Most Recent Result = 18 mg/L (08/31/11)
Before Treatment:	17 mg/L (06/23/11)
After Treatment:	0.28 mg/L (06/23/11)
	System installed June 2011.
Gas Wells ≤ 1000':	Baker 1V - P&A Baker 3H
Gas Wells 1000' - 2500':	Gesford 2V Gesford 7H Gesford 5H Gesford 1V
Plan Forward:	Continue to monitor as per CO&SA.
Comments:	Received escrow funds. Installed treatment system. Not primary residence.

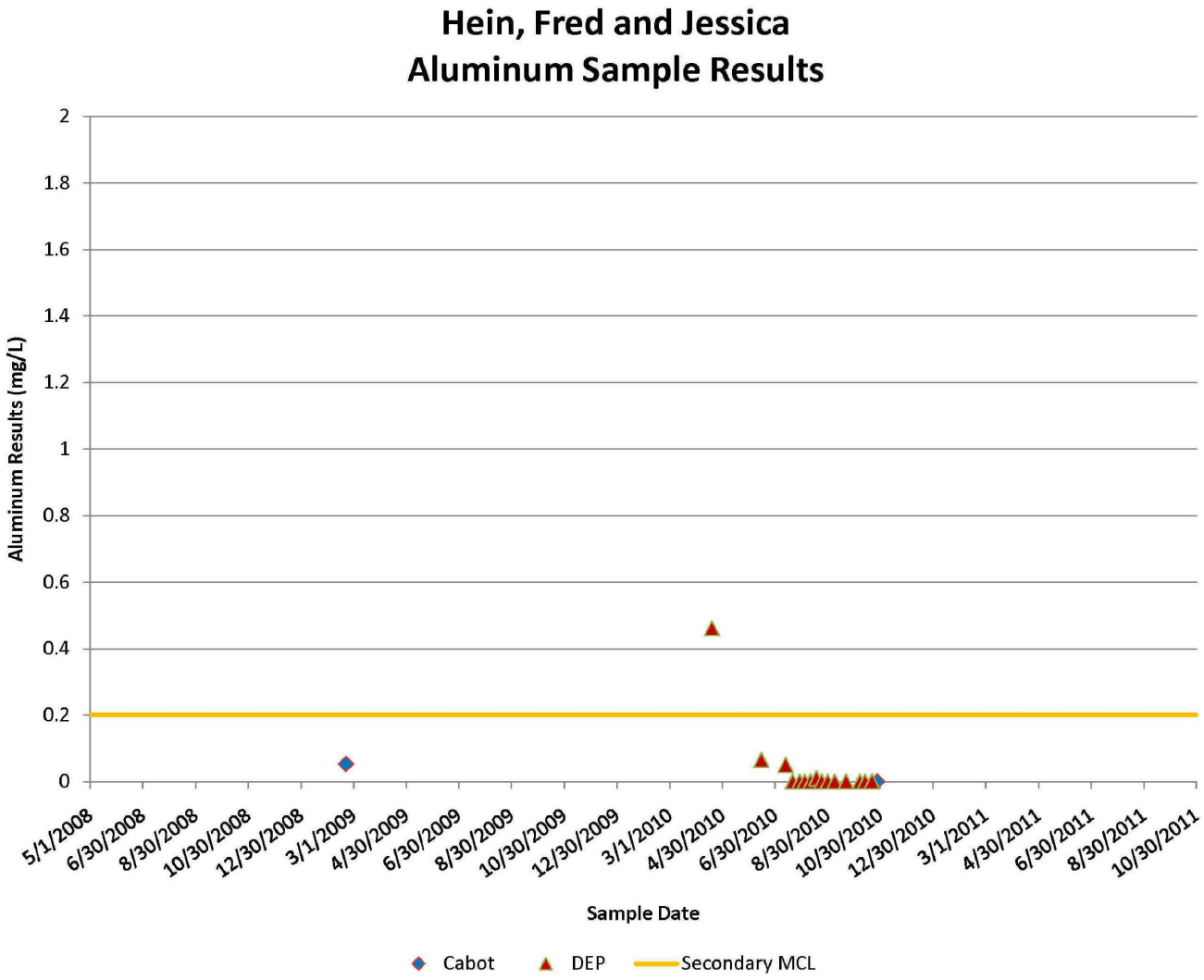
Hein – CGI and Dissolved Methane Graphs



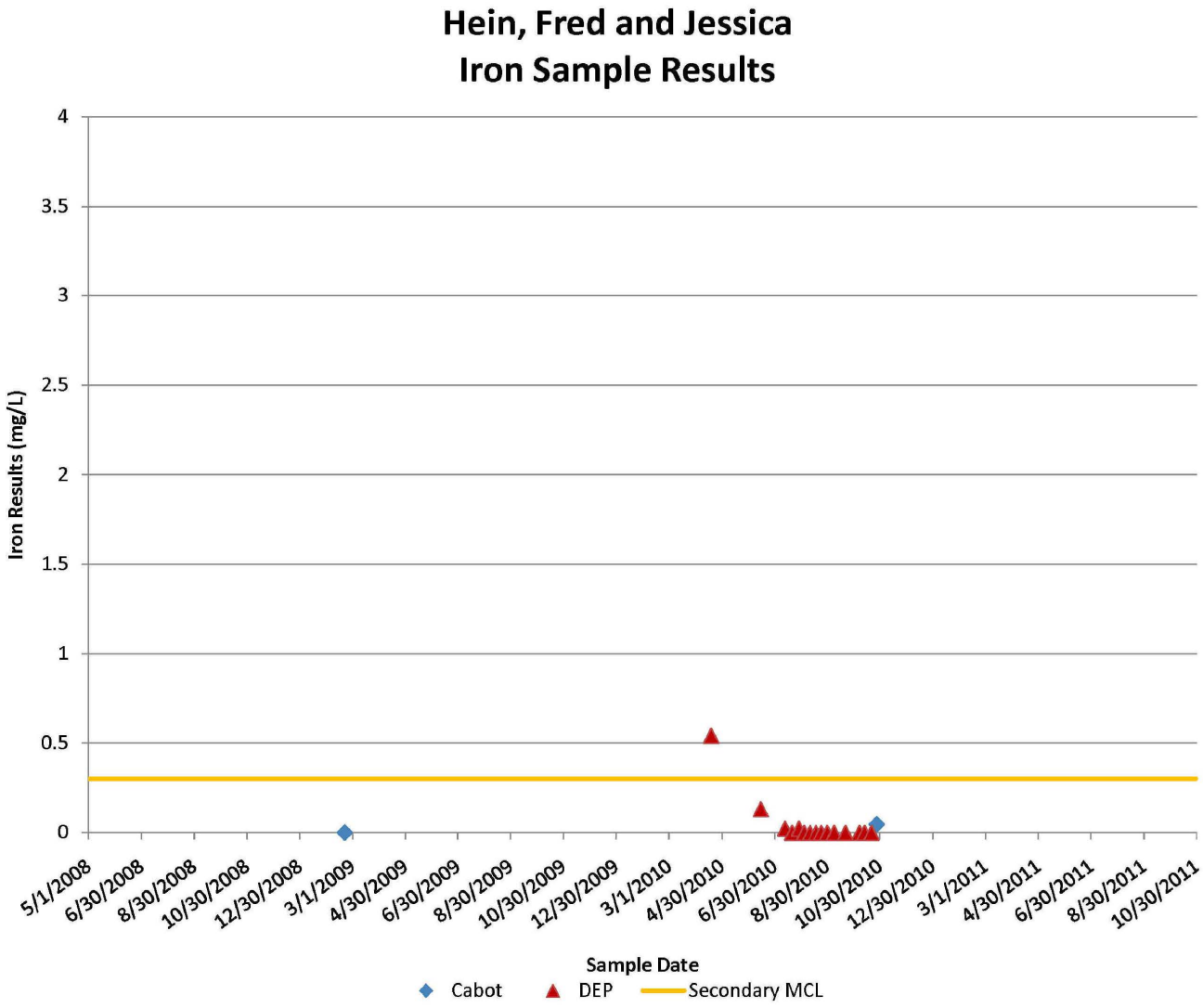
Hein, Fred and Jessica – CH4 results



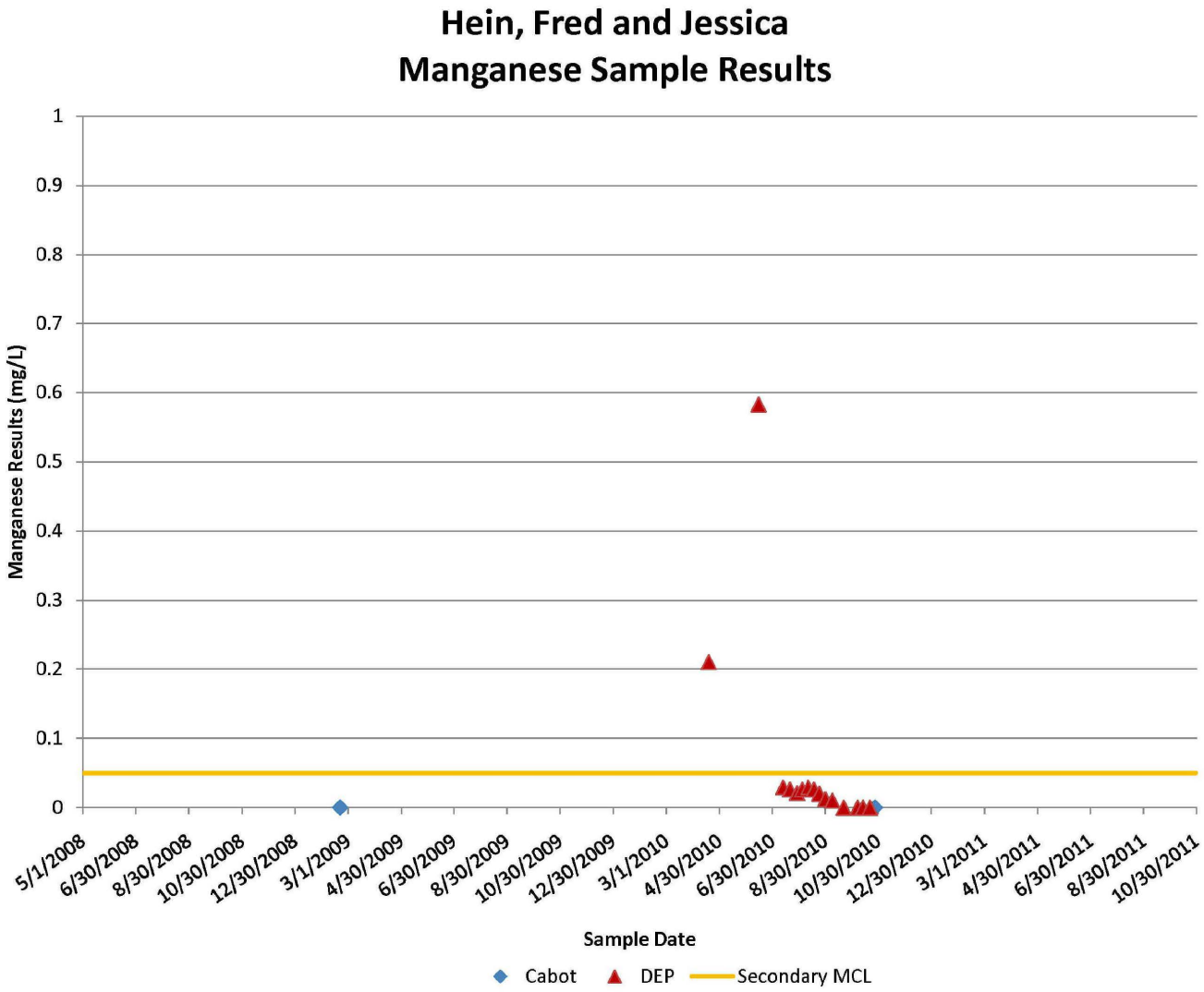
Hein, Fred and Jessica – Al results



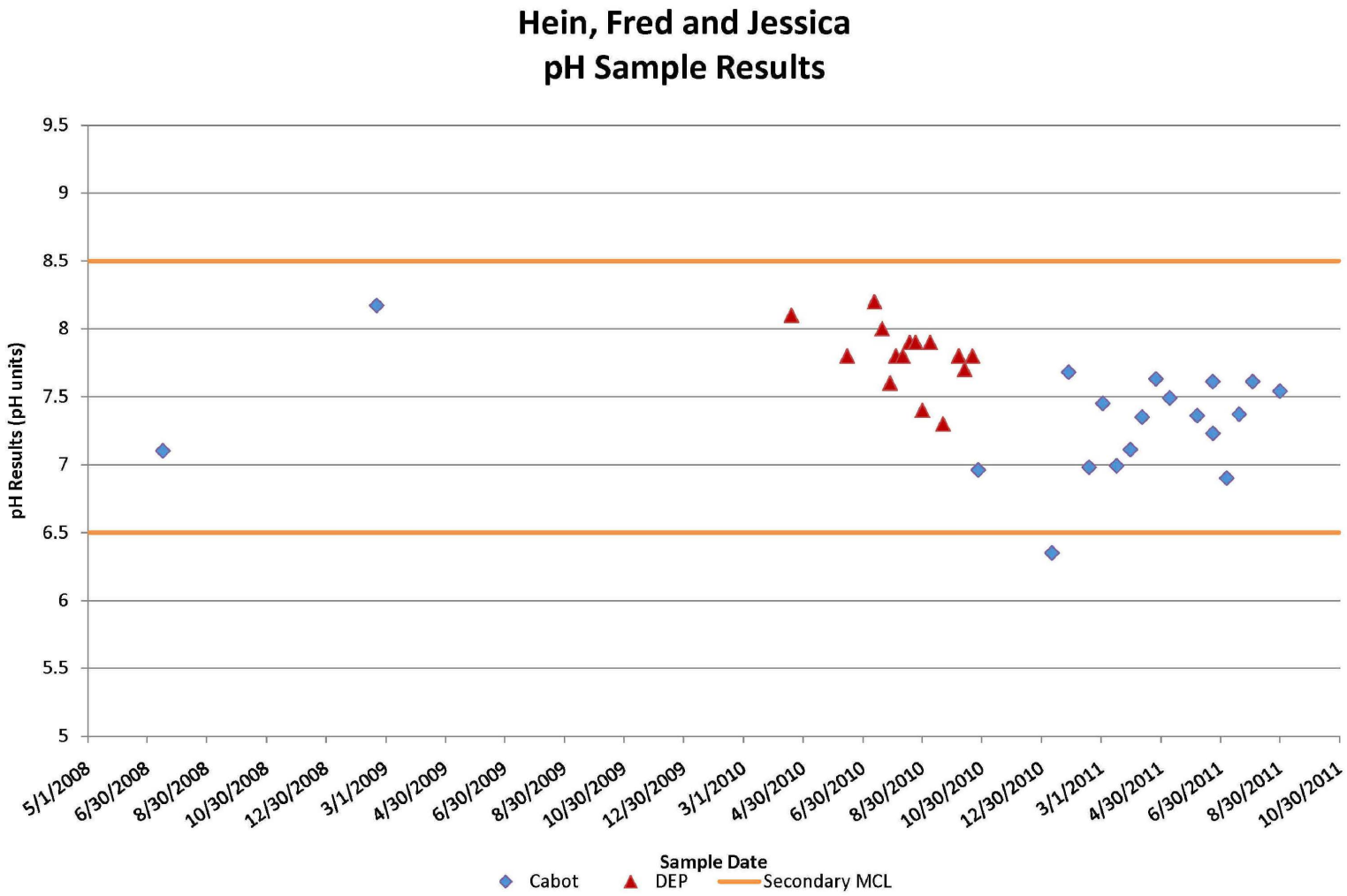
Hein, Fred and Jessica – Fe results



Hein, Fred and Jessica – Mn results



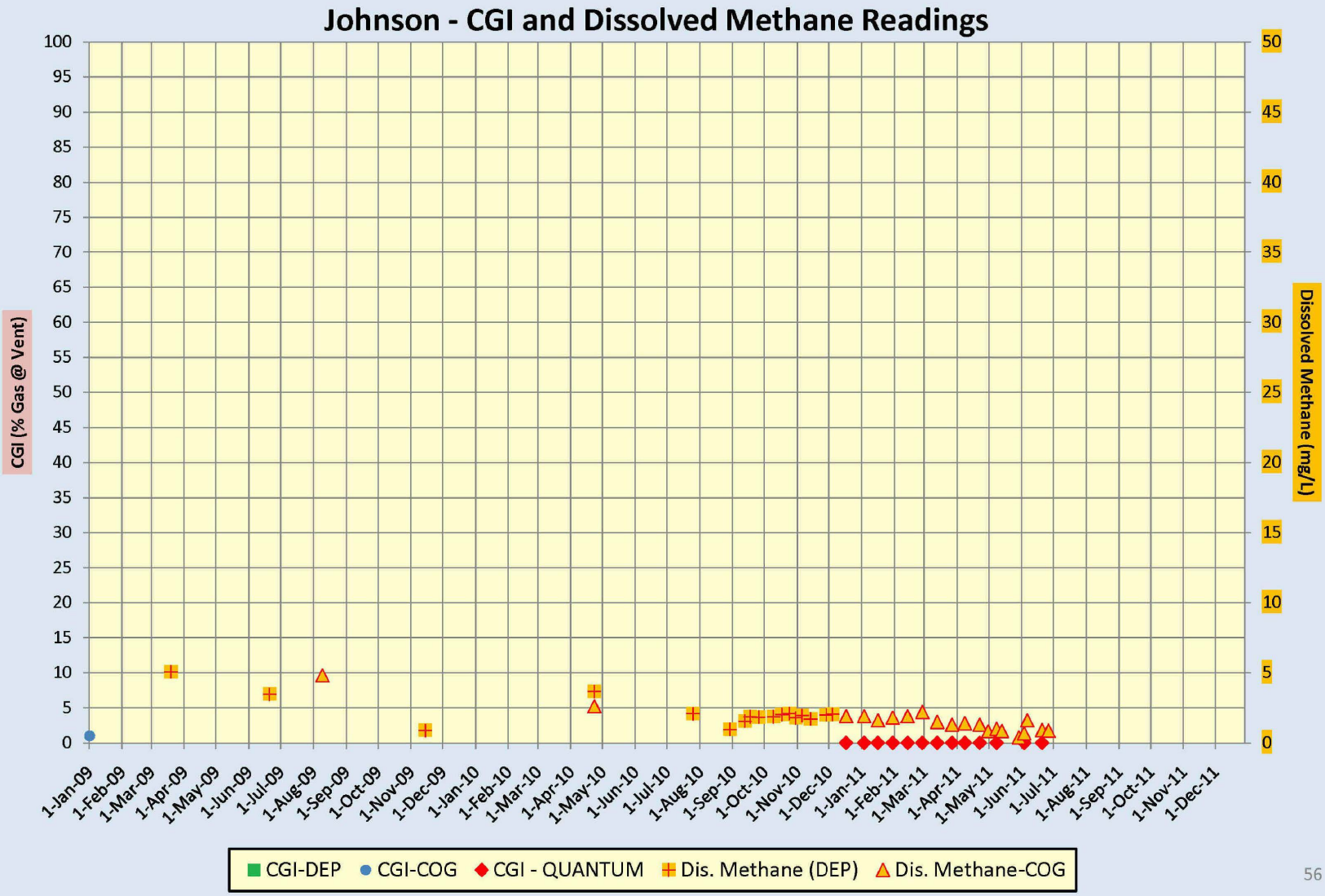
Hein, Fred and Jessica – pH results



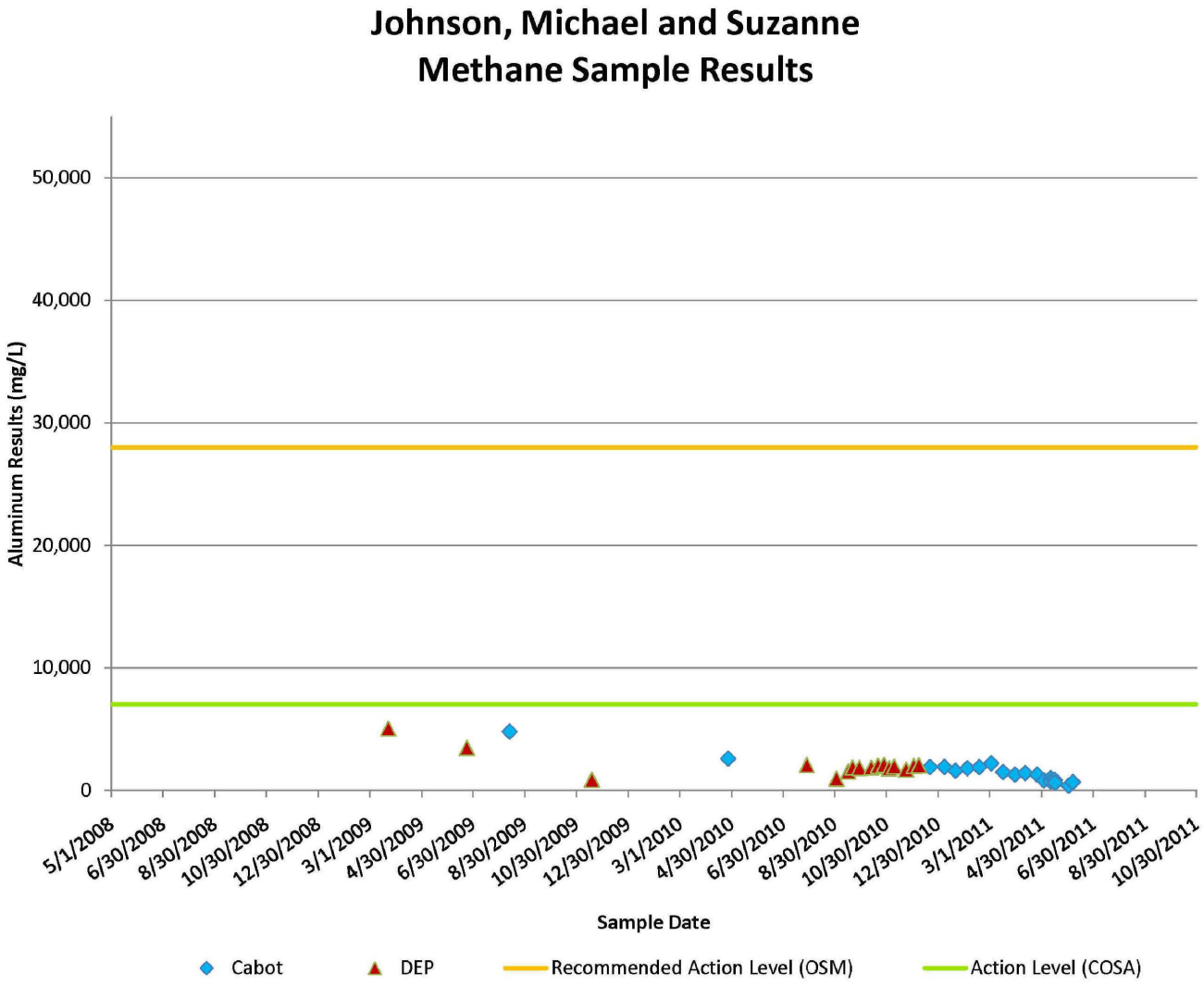
Johnson, Michael and Suzanne – Water Well Summary

Water Well - Owner	Michael and Suzanne Johnson
Exceed Primary:	None
Exceed Secondary:	Aluminum Iron
Dissolved Gas:	Most Recent Result = 0.880 mg/L (06/30/11)
Before Treatment:	1.6 mg/L (06/10/11)
After Treatment:	0.035 mg/L (06/10/11) System installed in May 2011. No methane above 7 mg/L in data history.
Gas Wells ≤ 1000':	Lewis 2V
Gas Wells 1000' - 2500':	Costello 2V Ely 2V Ely 4V Ely 6H Lewis 1V Costello 1V
Plan Forward:	Continue to monitor as per CO&SA.
Comments:	Received escrow funds. Installed treatment system. Receiving bottled and bulk water. High iron bacteria and total suspended solids (TSS) => the Johnson's shock chlorinated their well. Cabot to verify corrective action through analytical testing.

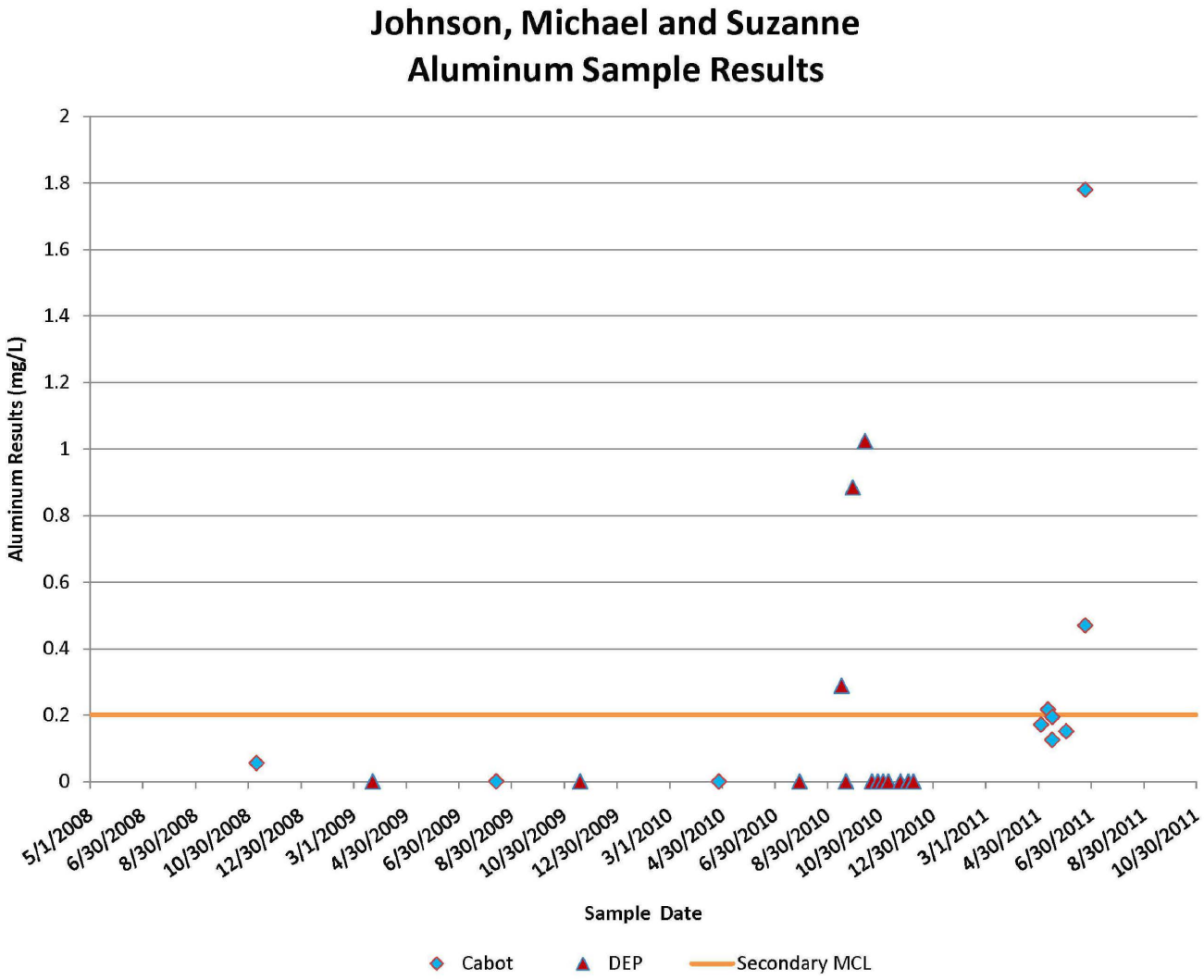
Johnson – CGI and Dissolved Methane Graphs



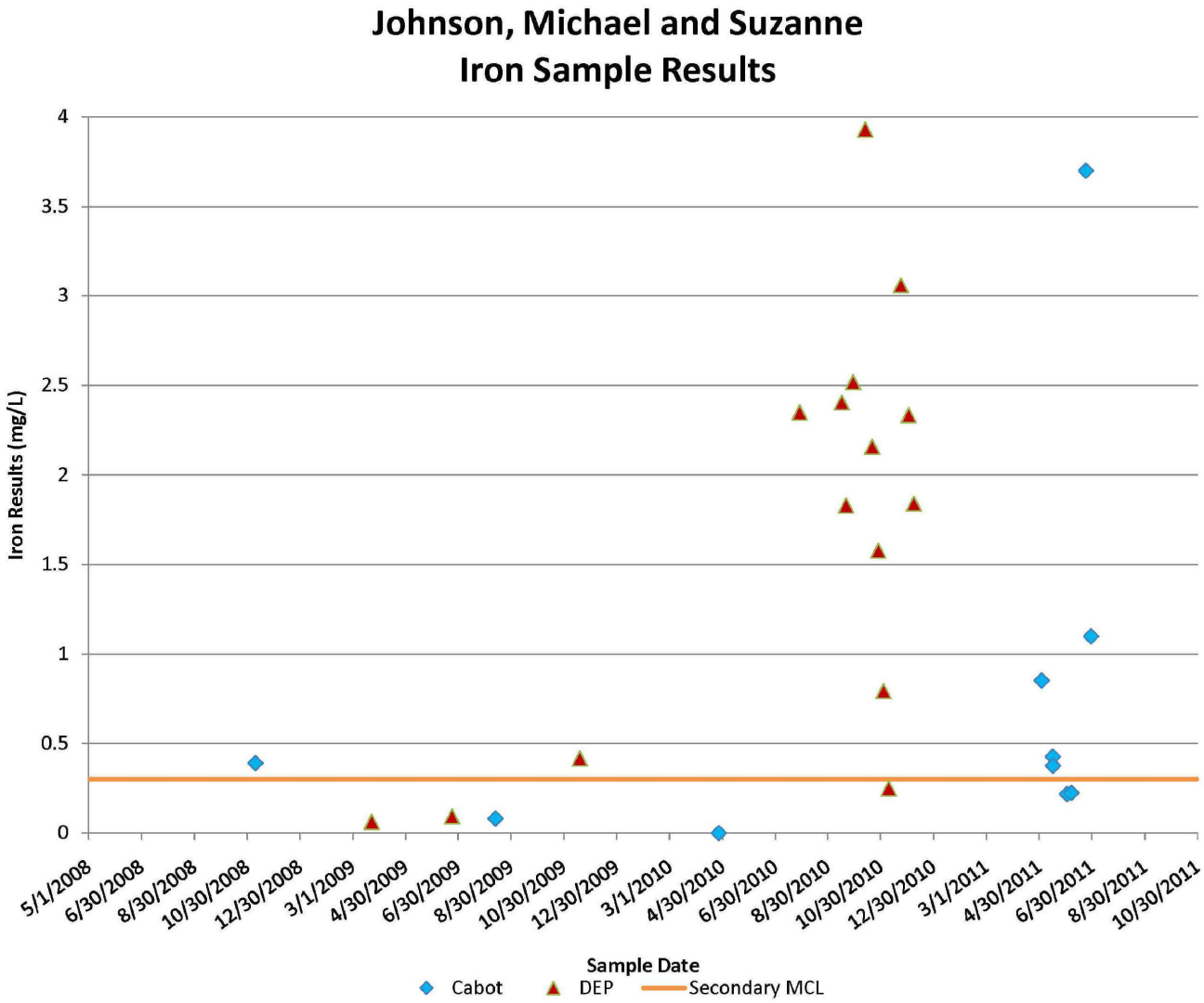
Johnson, Michael and Suzanne – CH4 results



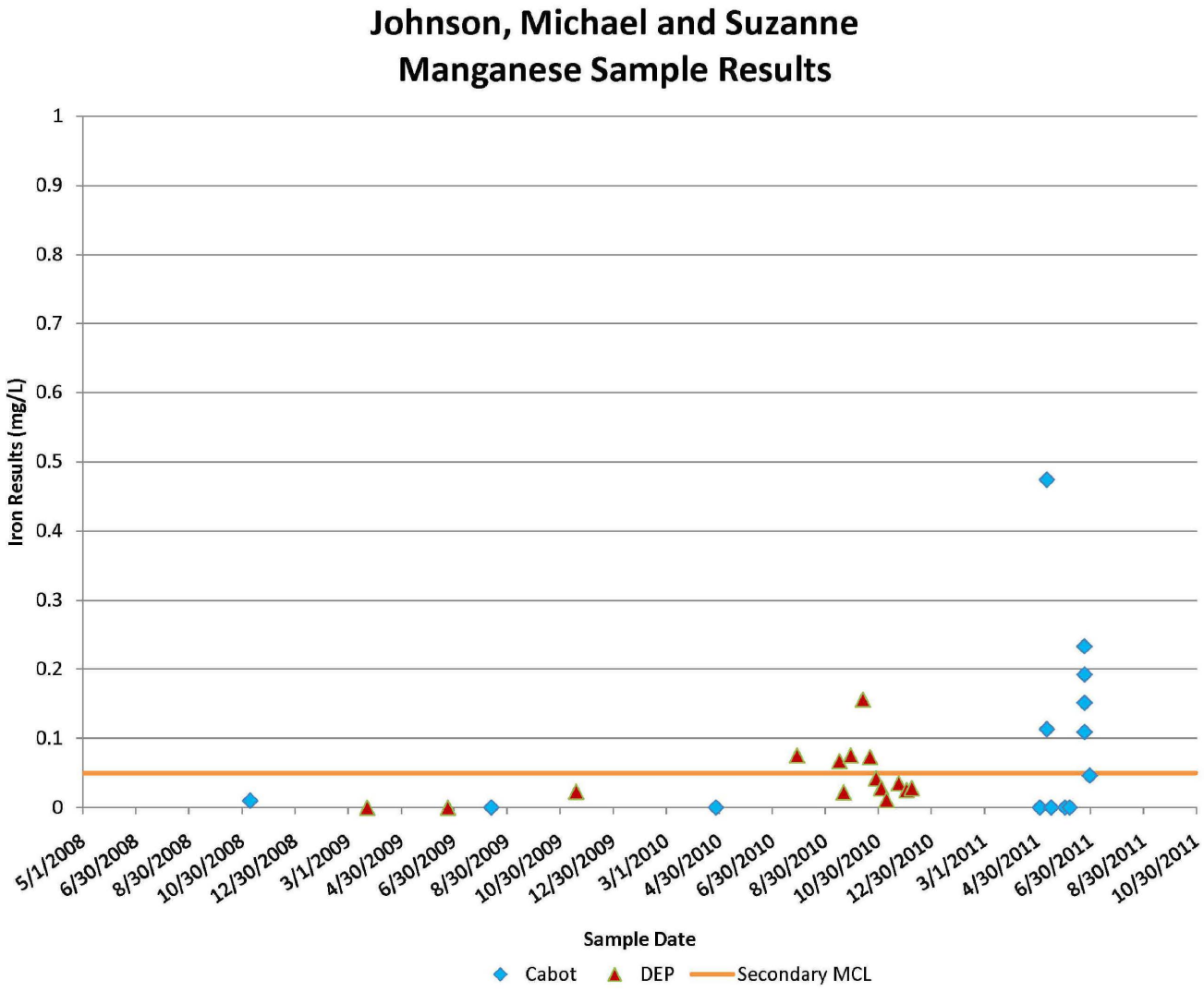
Johnson, Michael and Suzanne – Al results



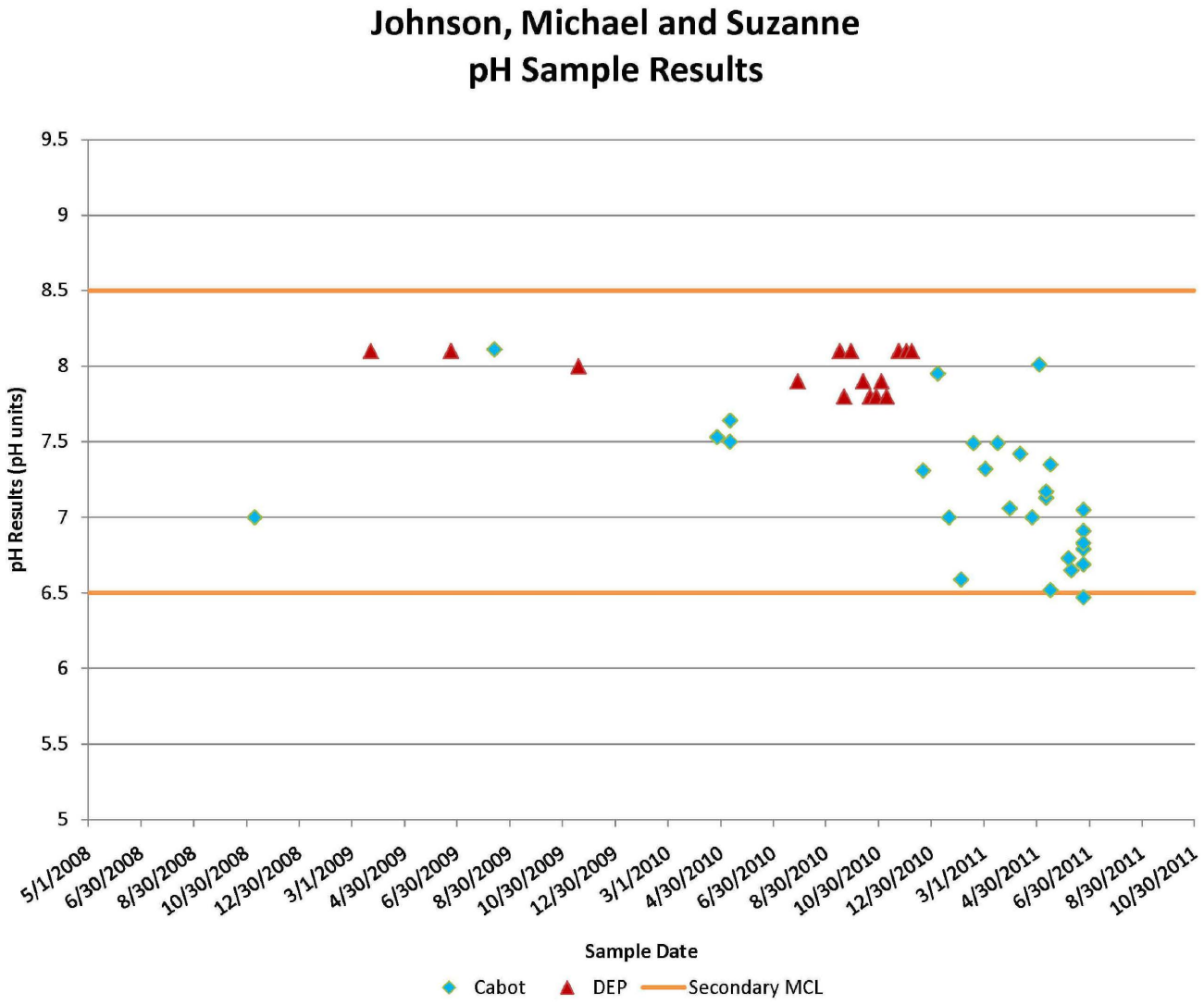
Johnson, Michael and Suzanne – Fe results



Johnson, Michael and Suzanne – Mn results



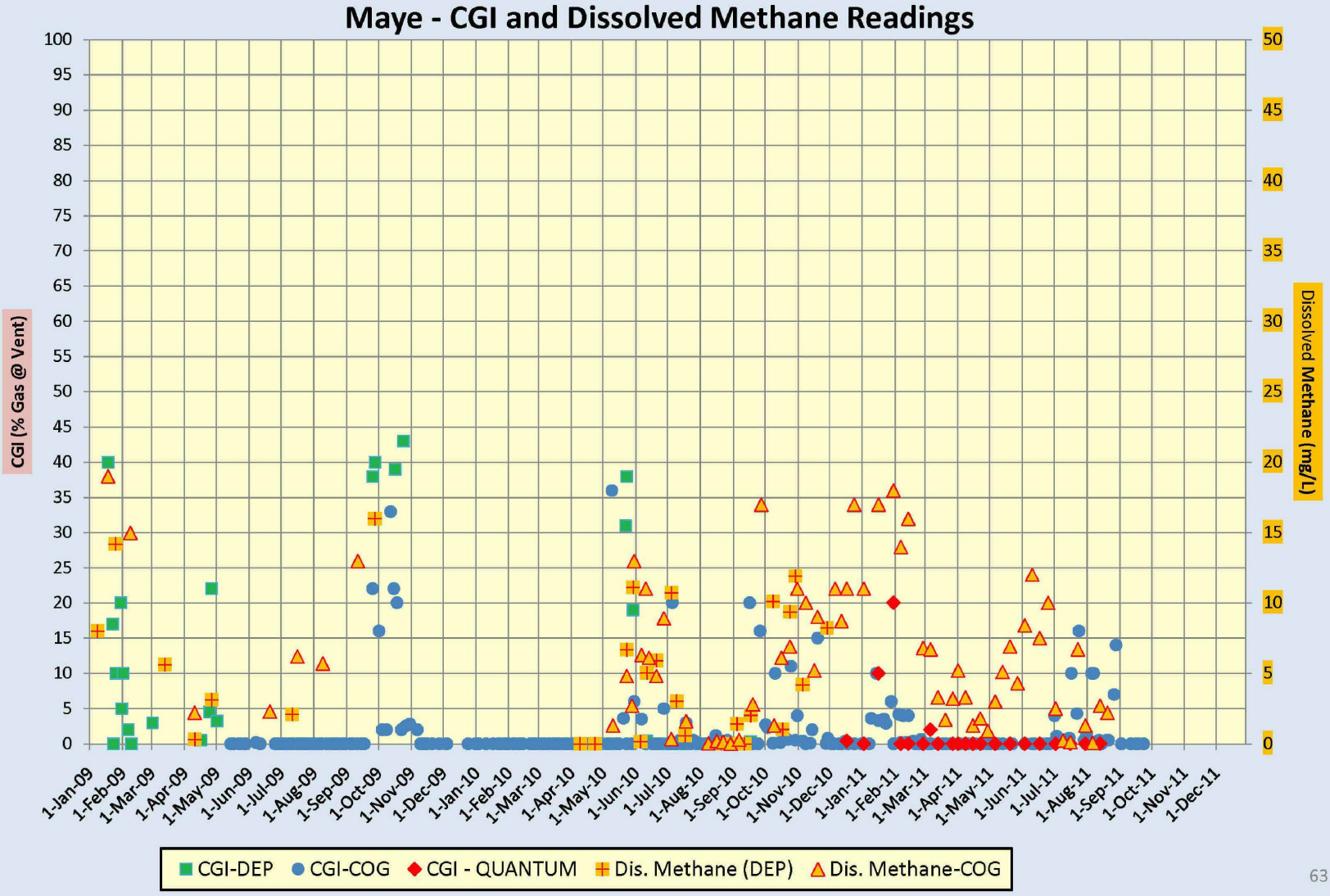
Johnson, Michael and Suzanne – pH results



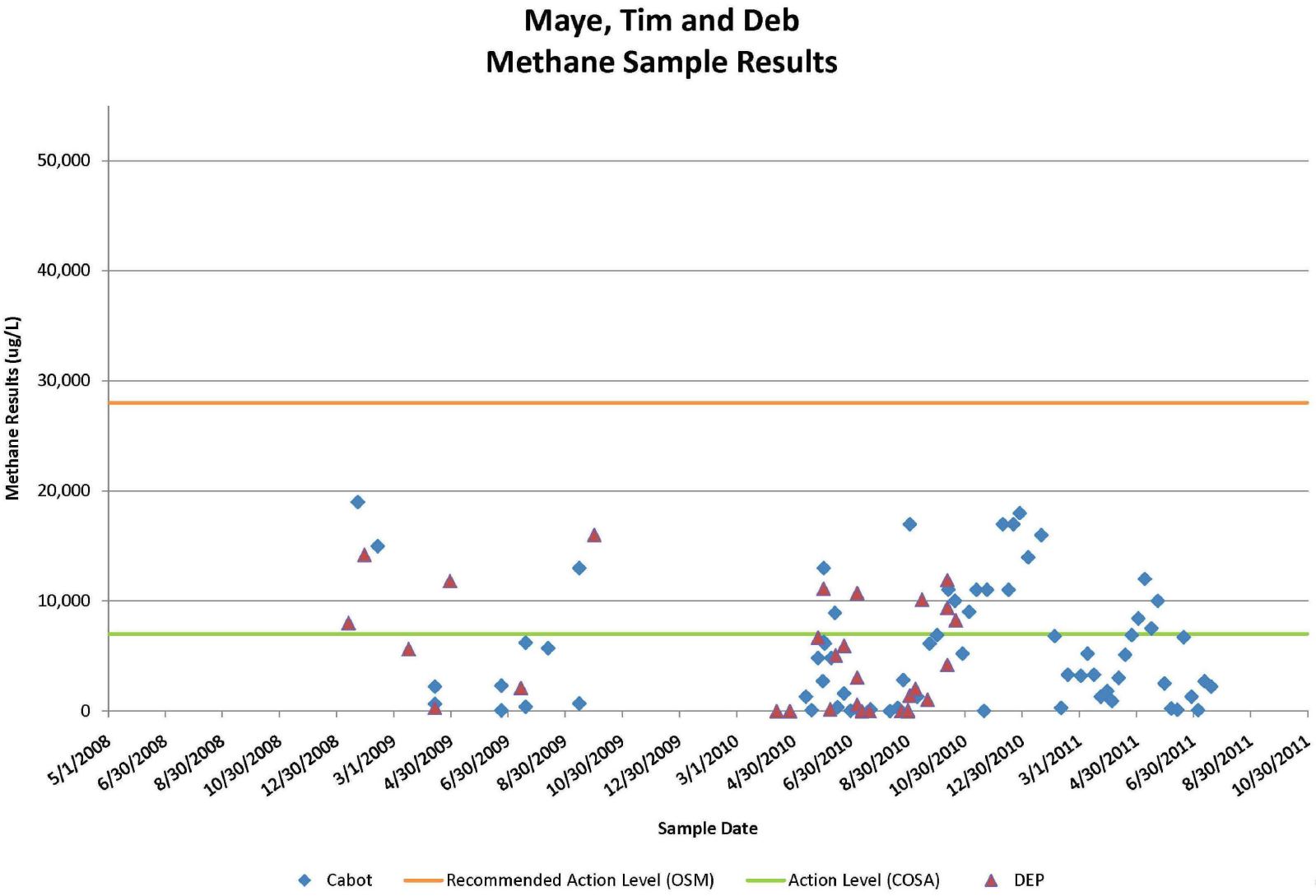
Maye, Timothy and Deborah – Water Well Summary

Water Well - Owner	Timothy and Deborah Maye
Exceed Primary:	None
Exceed Secondary:	None
Dissolved Gas:	Most Recent Result = 2.2 mg/L (08/24/11)
Before Treatment:	2.2 mg/L (08/24/11)
After Treatment:	0.099 mg/L (08/24/11)
	System installed May 2010.
Gas Wells ≤ 1000':	None
Gas Wells 1000' - 2500':	Baker 1V - P&A Baker 3H Gesford 5H Gesford 1V
Plan Forward:	Continue to monitor as per CO&SA.
Comments:	Received escrow funds. Installed treatment system. Receiving bottle water.

Maye – CGI and Dissolved Methane Graphs



Maye, Tim and Deb – CH4 results



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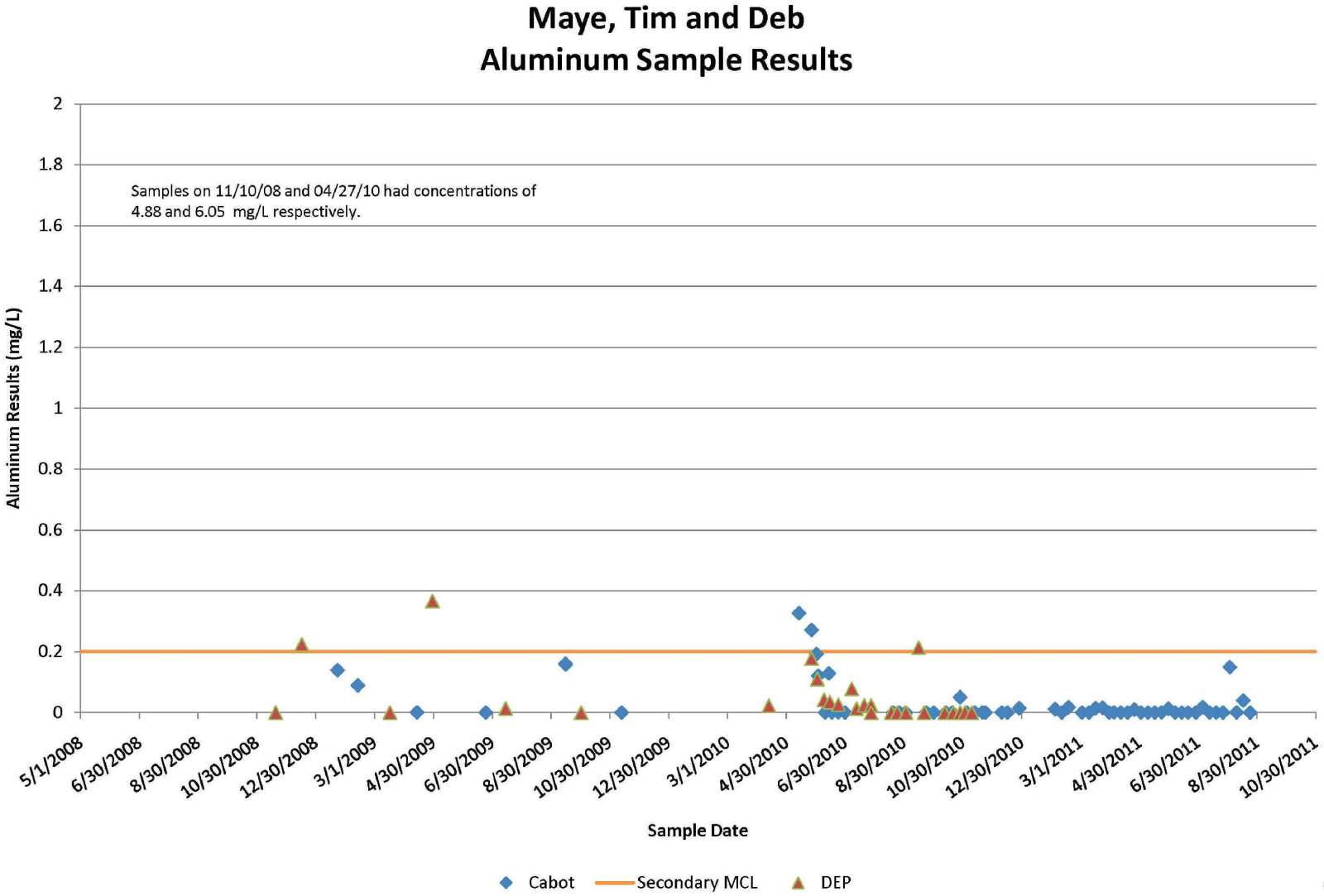
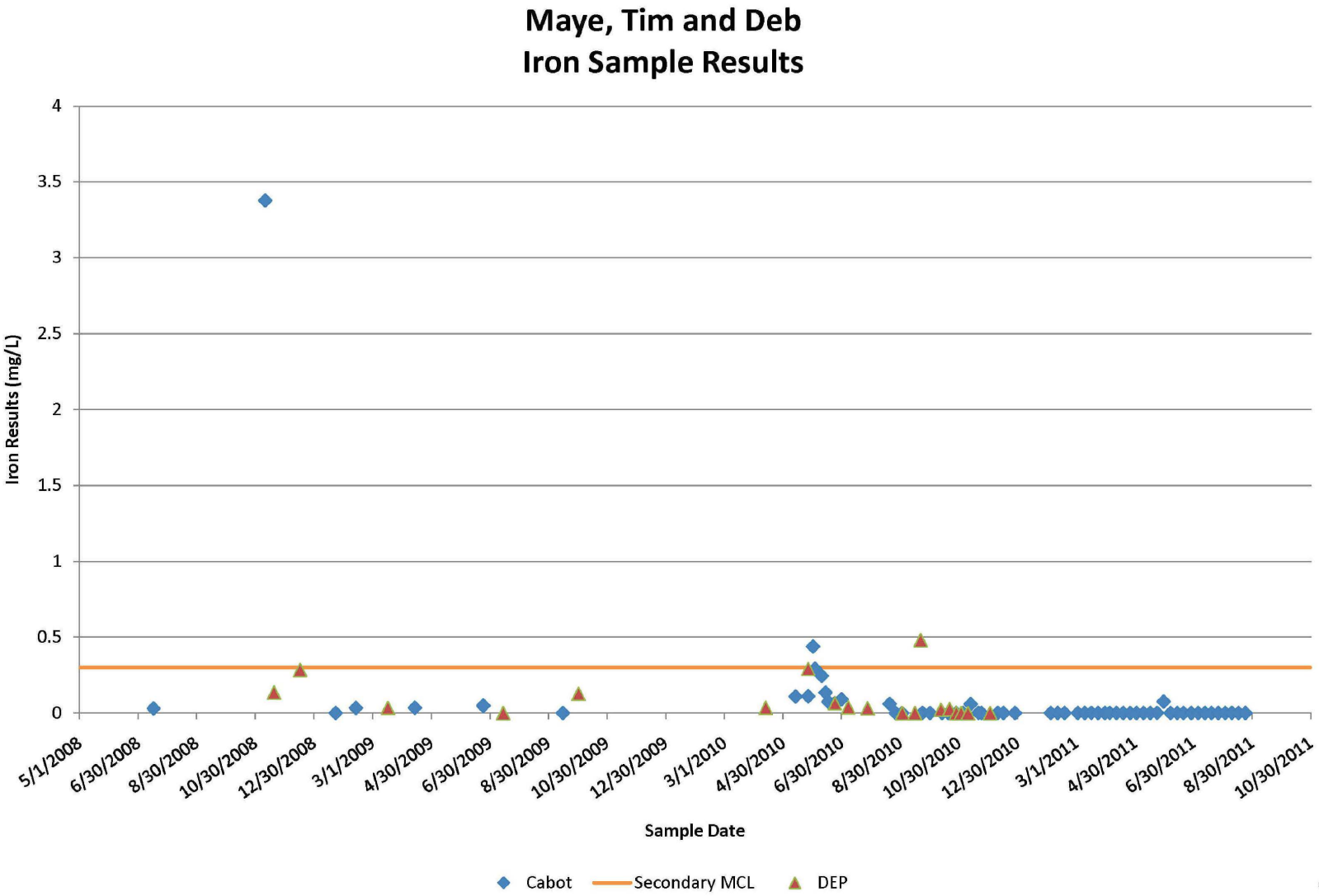
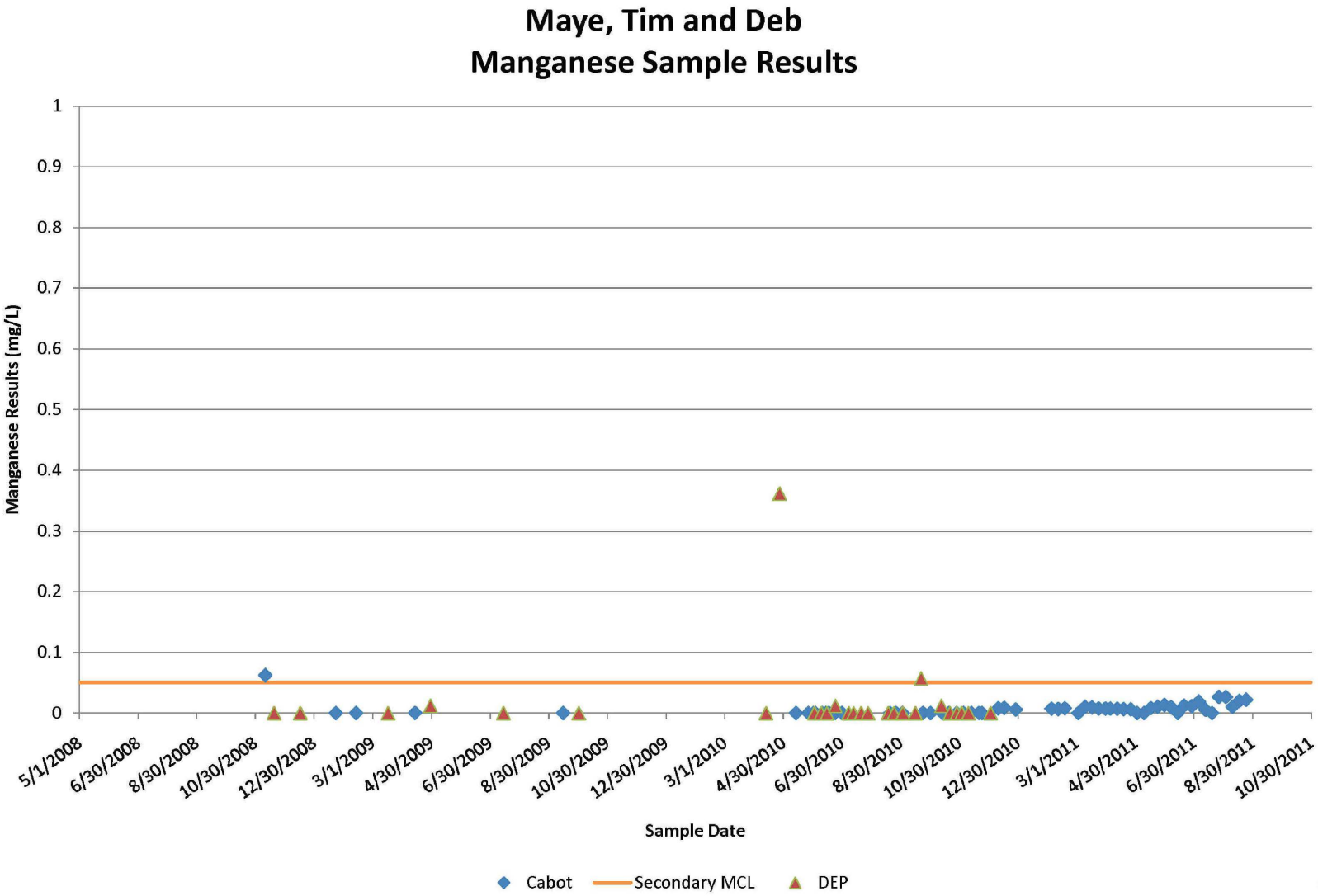
Maye, Tim and Deb – Al results



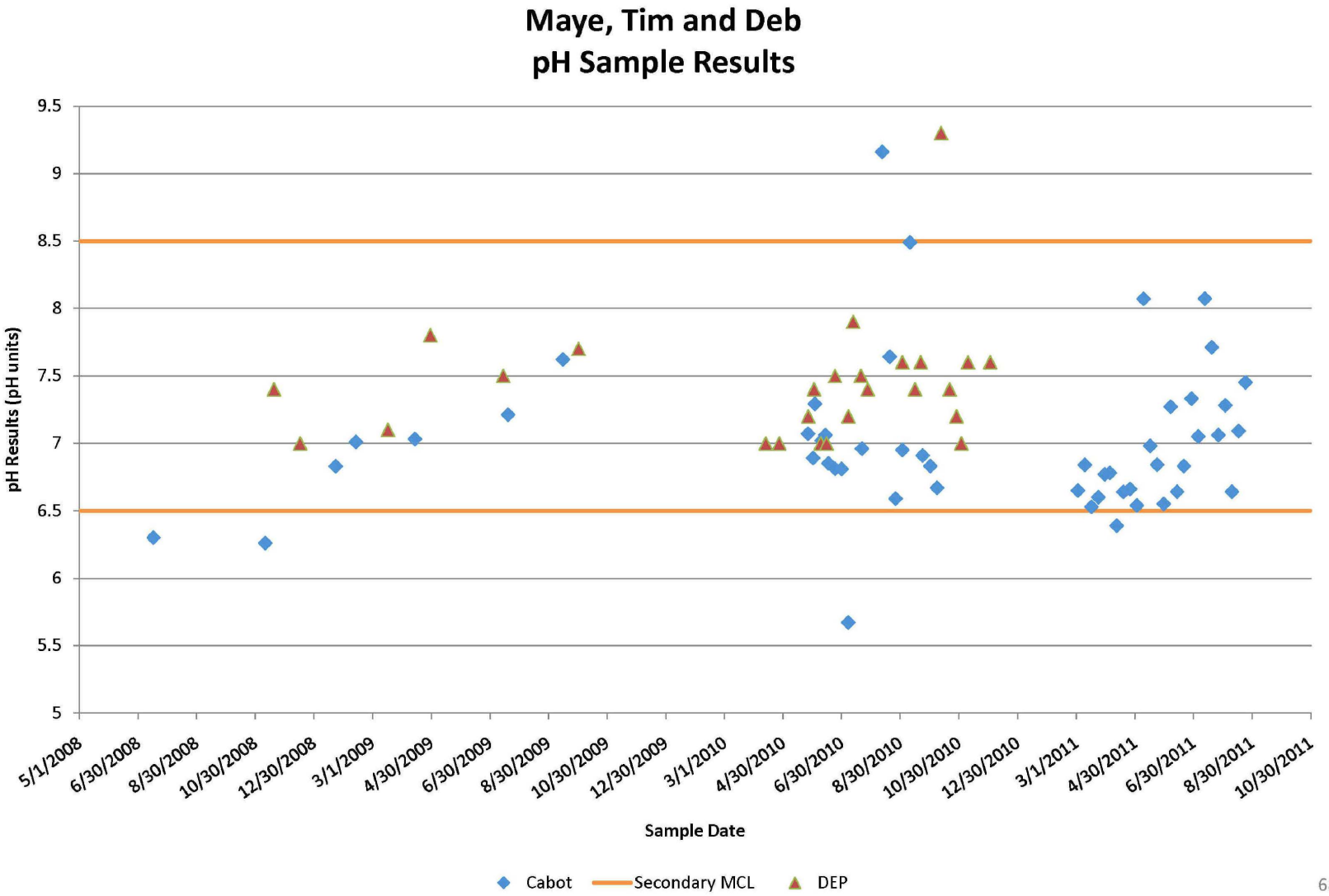
Maye, Tim and Deb – Fe results



Maye, Tim and Deb – Mn results



Maye, Tim and Deb – pH results



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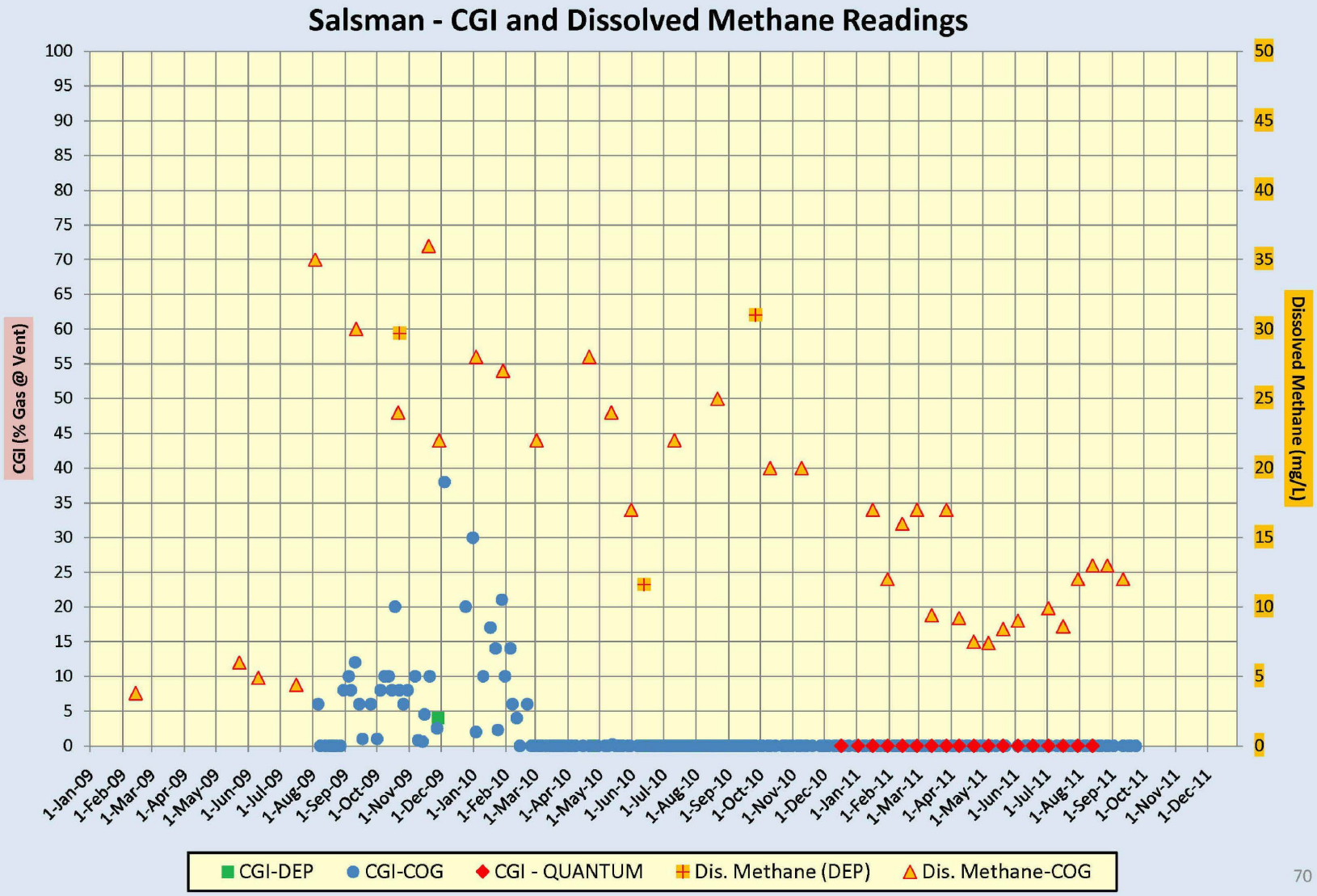
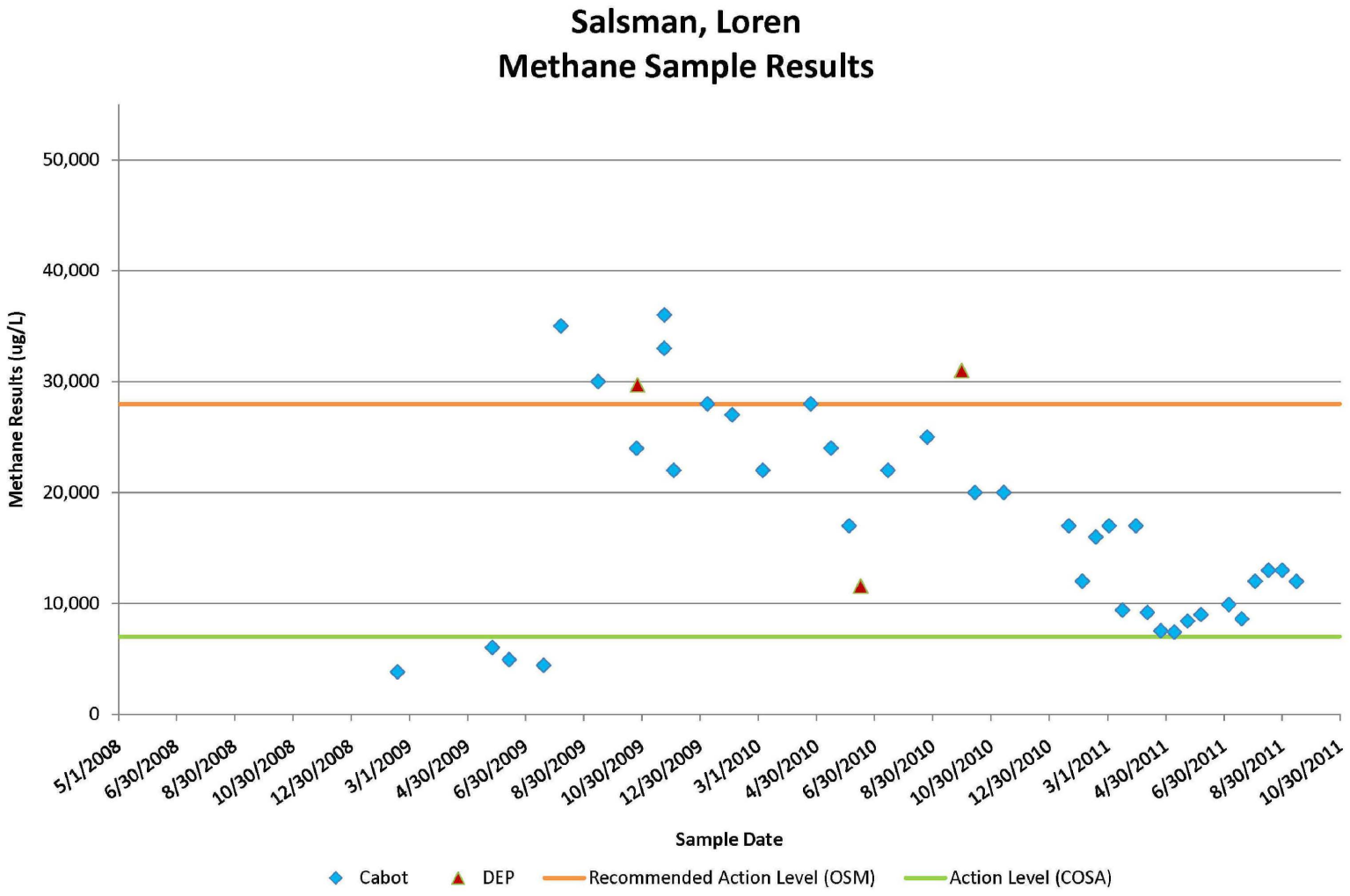
Salsman, Loren – Water Well Summary

Water Well - Owner	Loren Salsman
Exceed Primary:	None
Exceed Secondary:	Iron Manganese
Dissolved Gas:	Most Recent Result = 12 mg/L (09/15/11)
Before Treatment:	12 mg/L (08/03/11)
After Treatment:	0.19 mg/L (08/03/11) Mobile system installed October 2010 and permanent system installed November 2010.
Gas Wells ≤ 1000':	Ratzel 1H Ratzel 3V Ratzel 2H
Gas Wells 1000' - 2500':	None
Plan Forward:	Continue to monitor as per CO&SA.
Comments:	Microbial Gas. Received escrow funds. Installed treatment system.

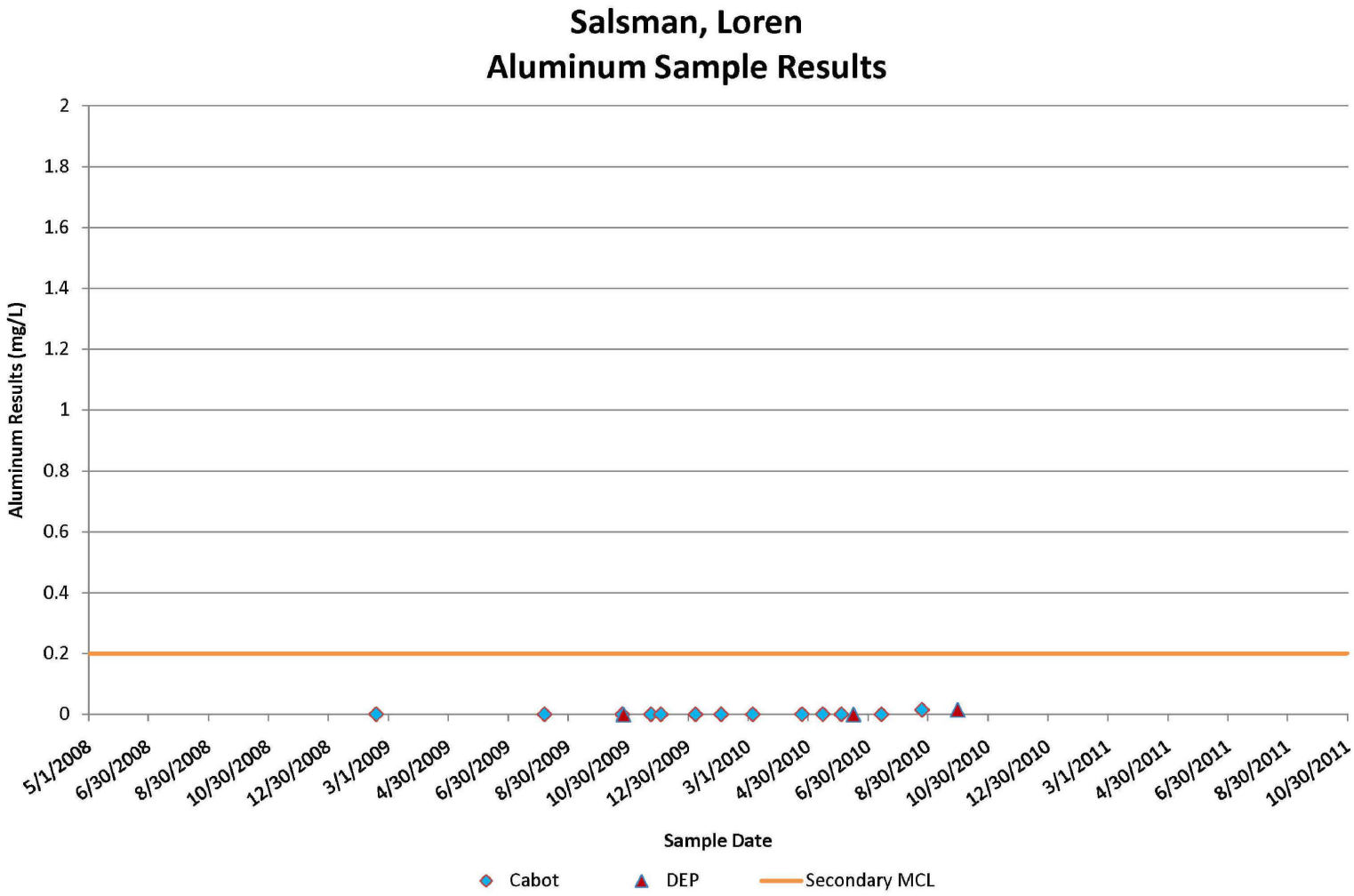
Salsman – CGI and Dissolved Methane Graphs



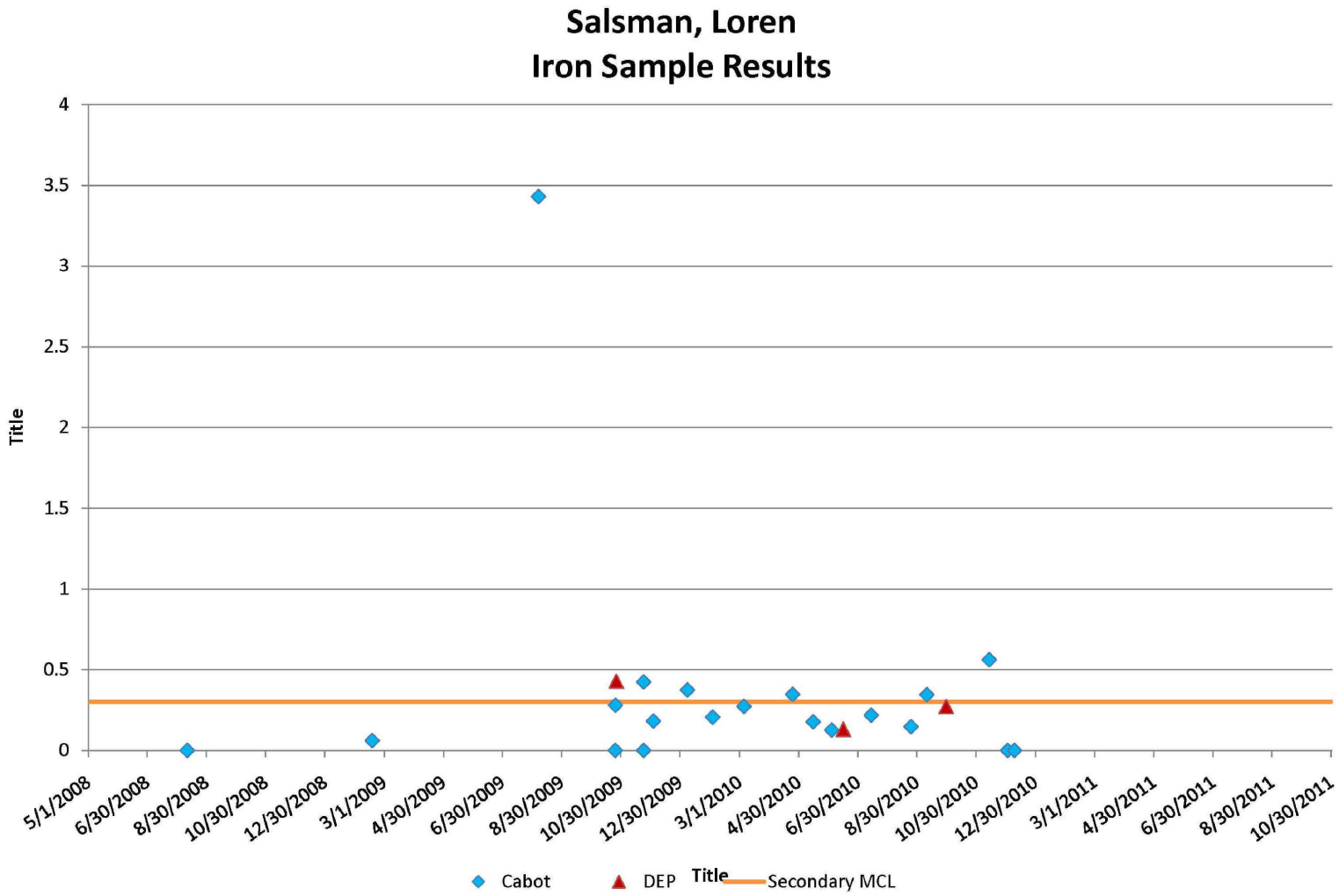
Salsman, Loren – CH4 results



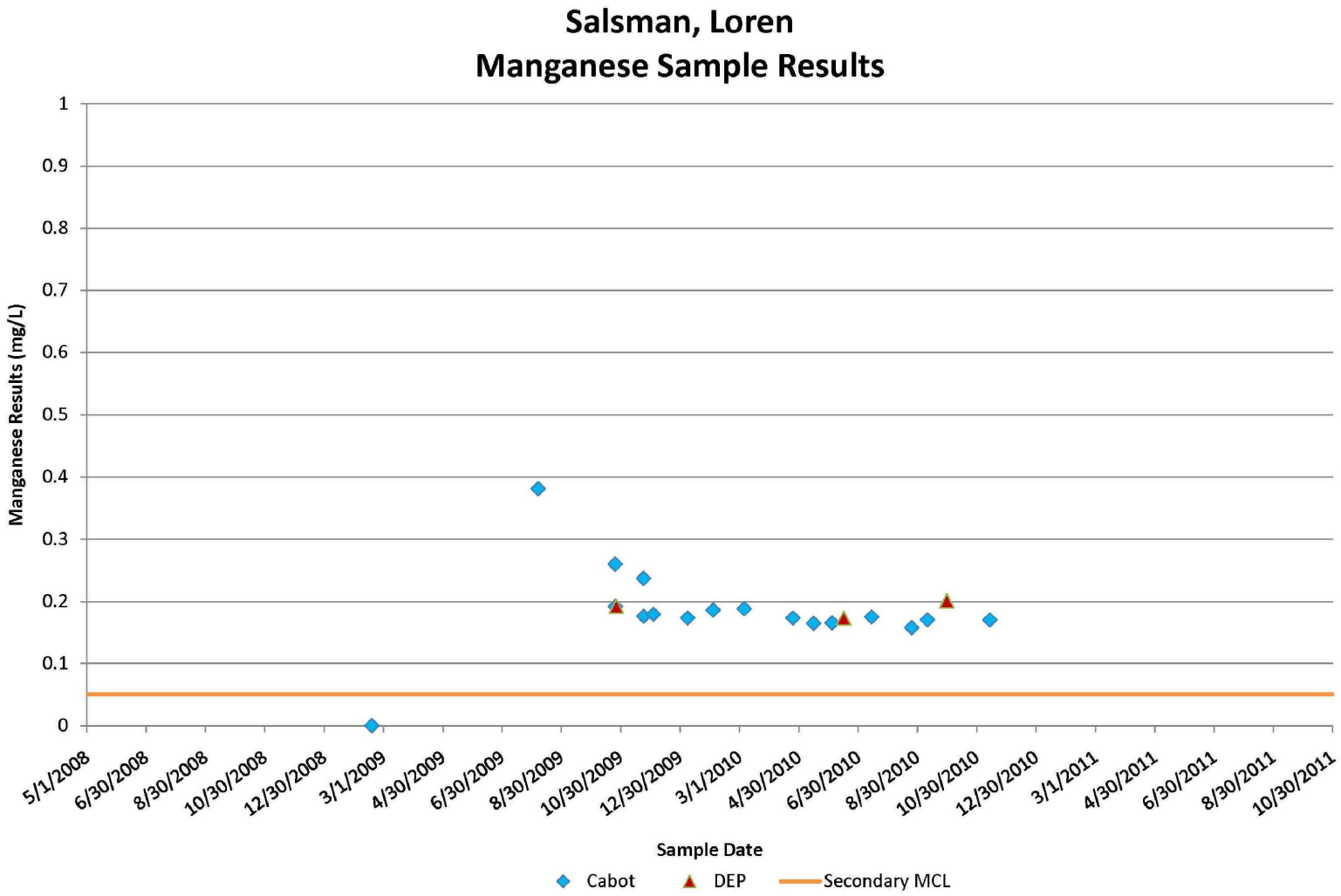
Salsman, Loren – Al results



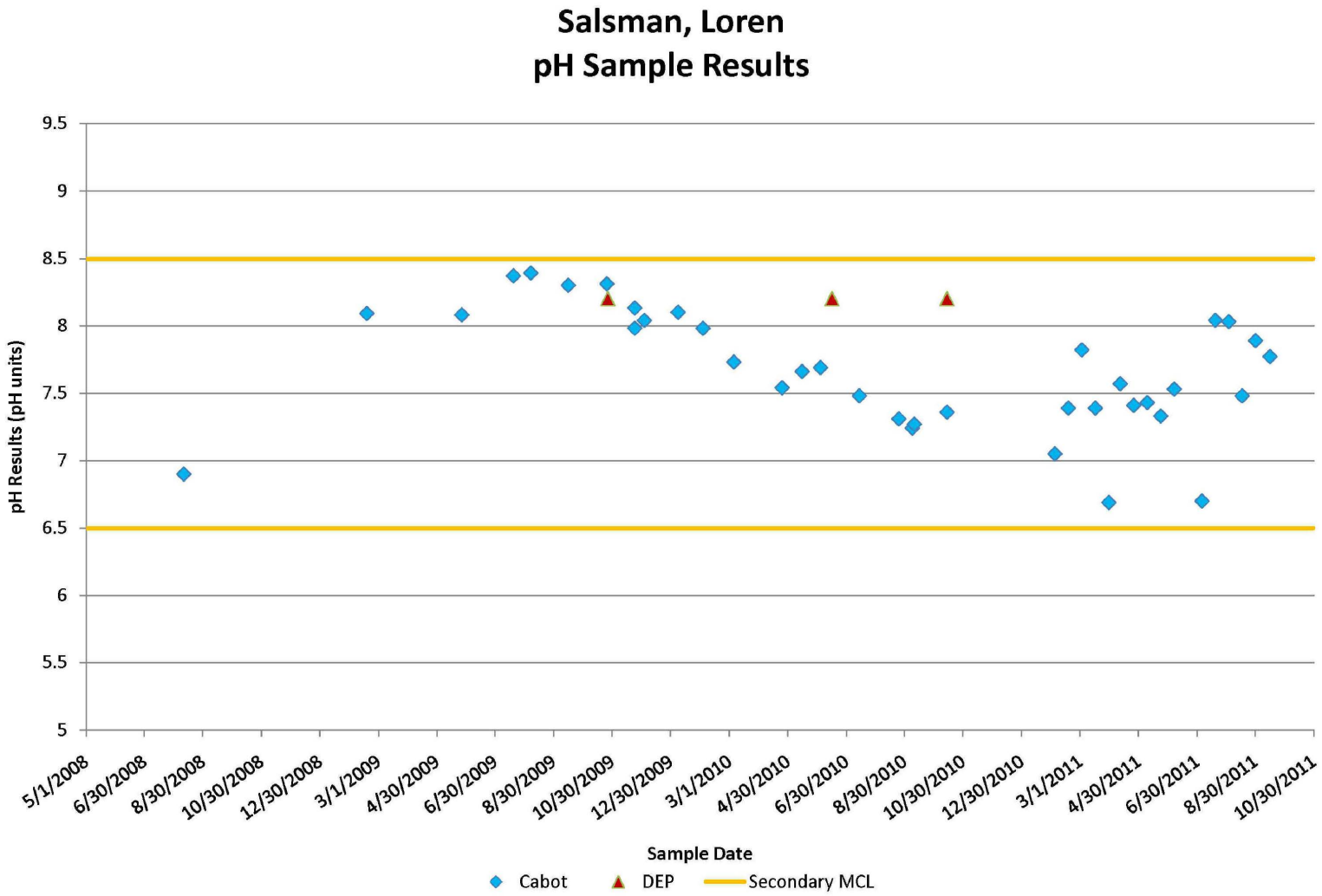
Salsman, Loren – Fe results



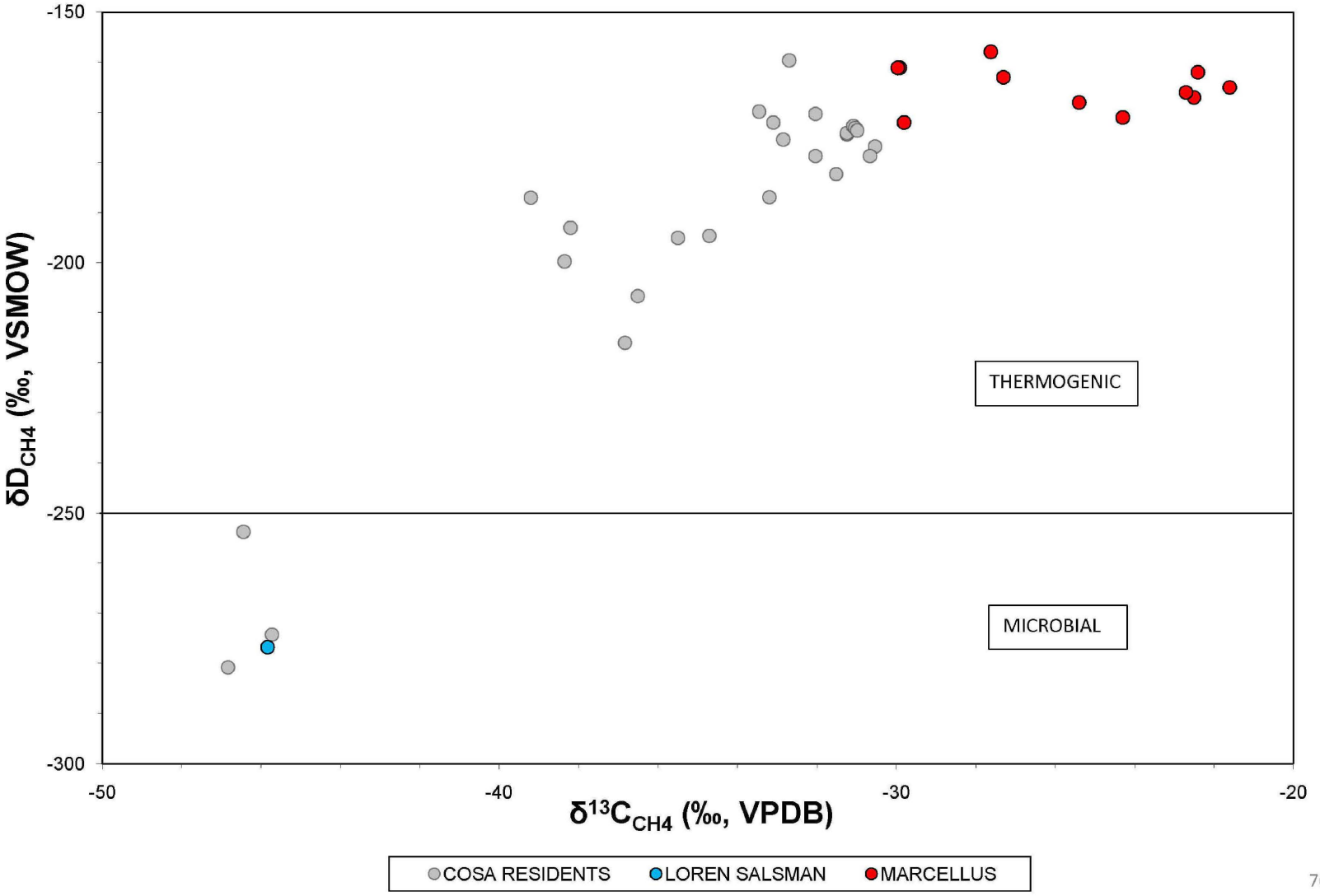
Salsman, Loren – Mn results



Salsman, Loren – pH results



Salsman, Loren – Isotopes



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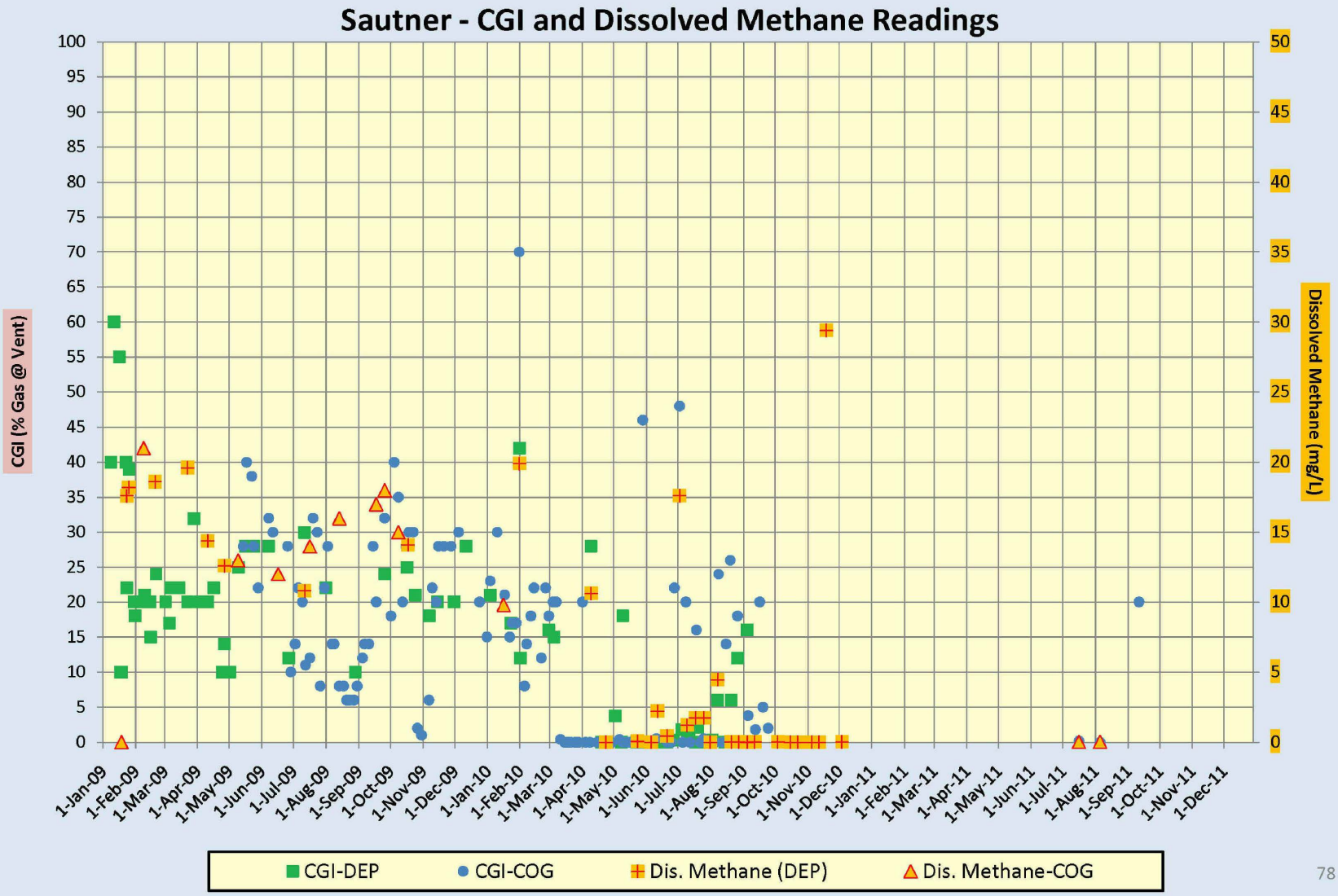
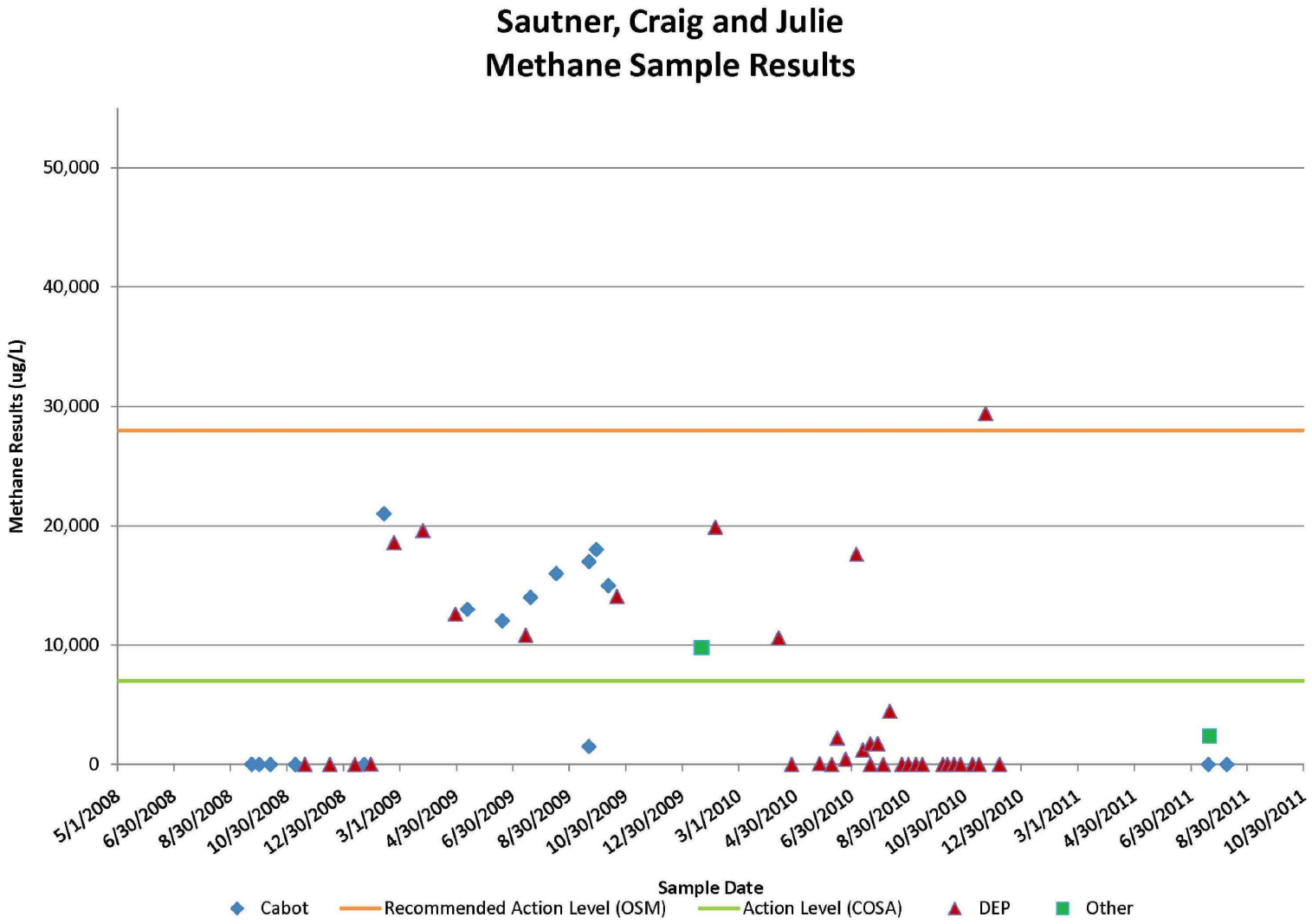
Sautner, Craig and Julie – Water Well Summary

Water Well - Owner	Craig and Julie Sautner
Exceed Primary:	None
Exceed Secondary:	None
Dissolved Gas:	Most Recent Result = <0.026 mg/L (08/09/11)
Before Treatment:	N/A
After Treatment:	N/A
Gas Wells ≤ 1000':	None
Gas Wells 1000' - 2500':	Baker 1V - P&A Baker 3H – Not completed
	Gesford 1V Gesford 5H
Plan Forward:	Offer treatment system.
Comments:	Receiving bottled and bulk water. Refusing to allow sampling. Refused treatment system.

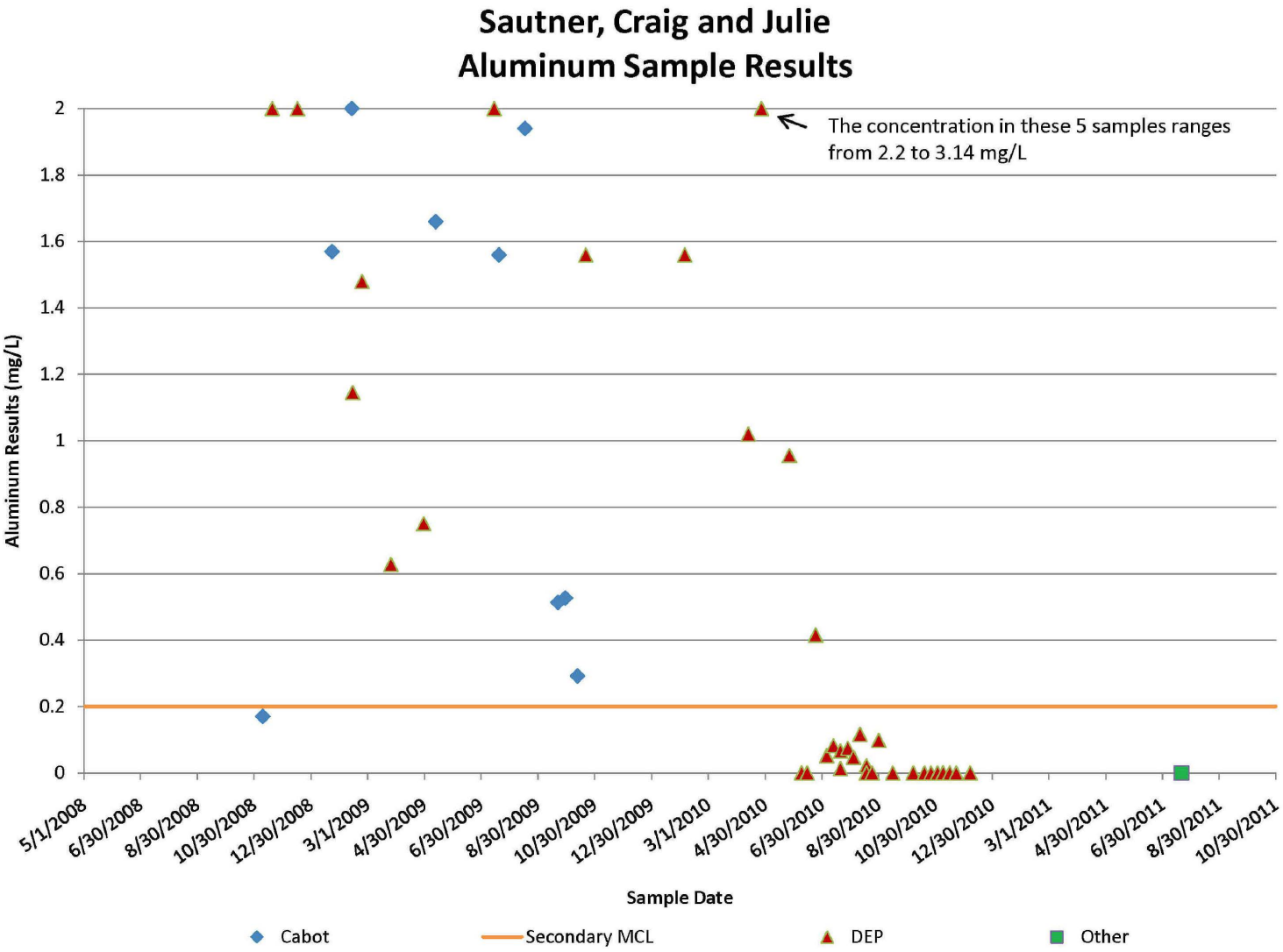
Sautner – CGI and Dissolved Methane Graphs



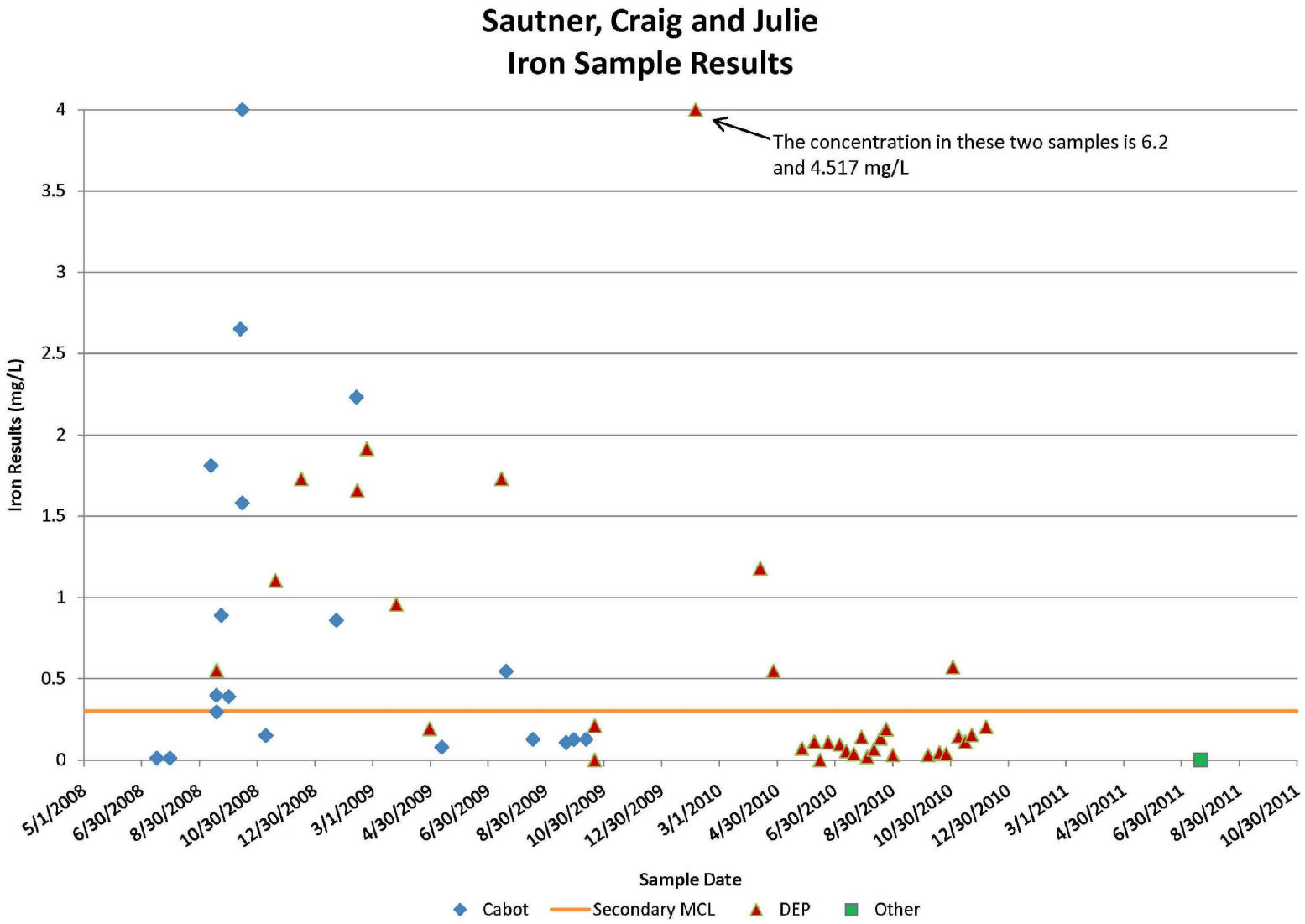
Sautner, Craig and Julie – CH4 results



Sautner, Craig and Julie – Al results



Sautner, Craig and Julie – Fe results



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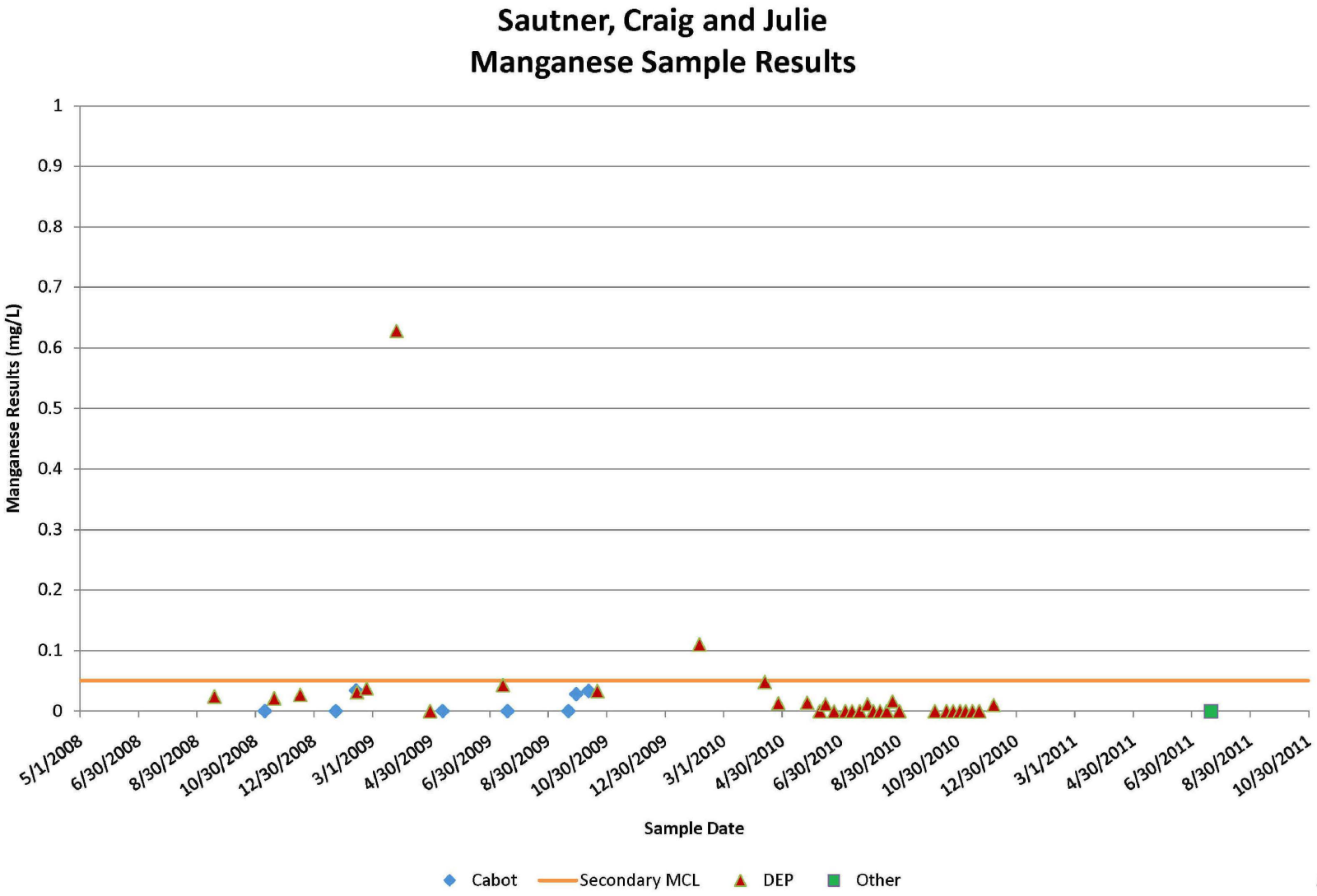
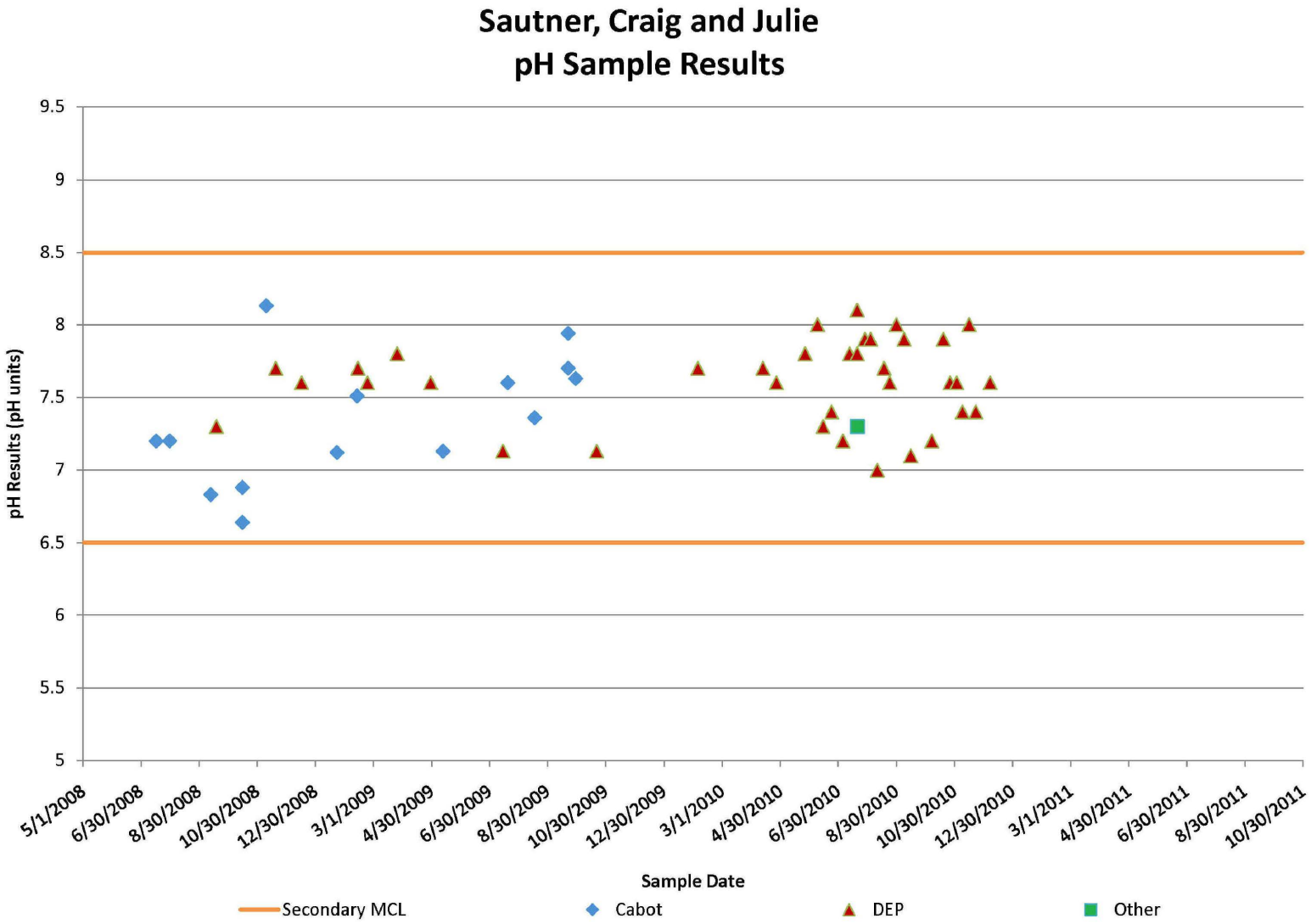
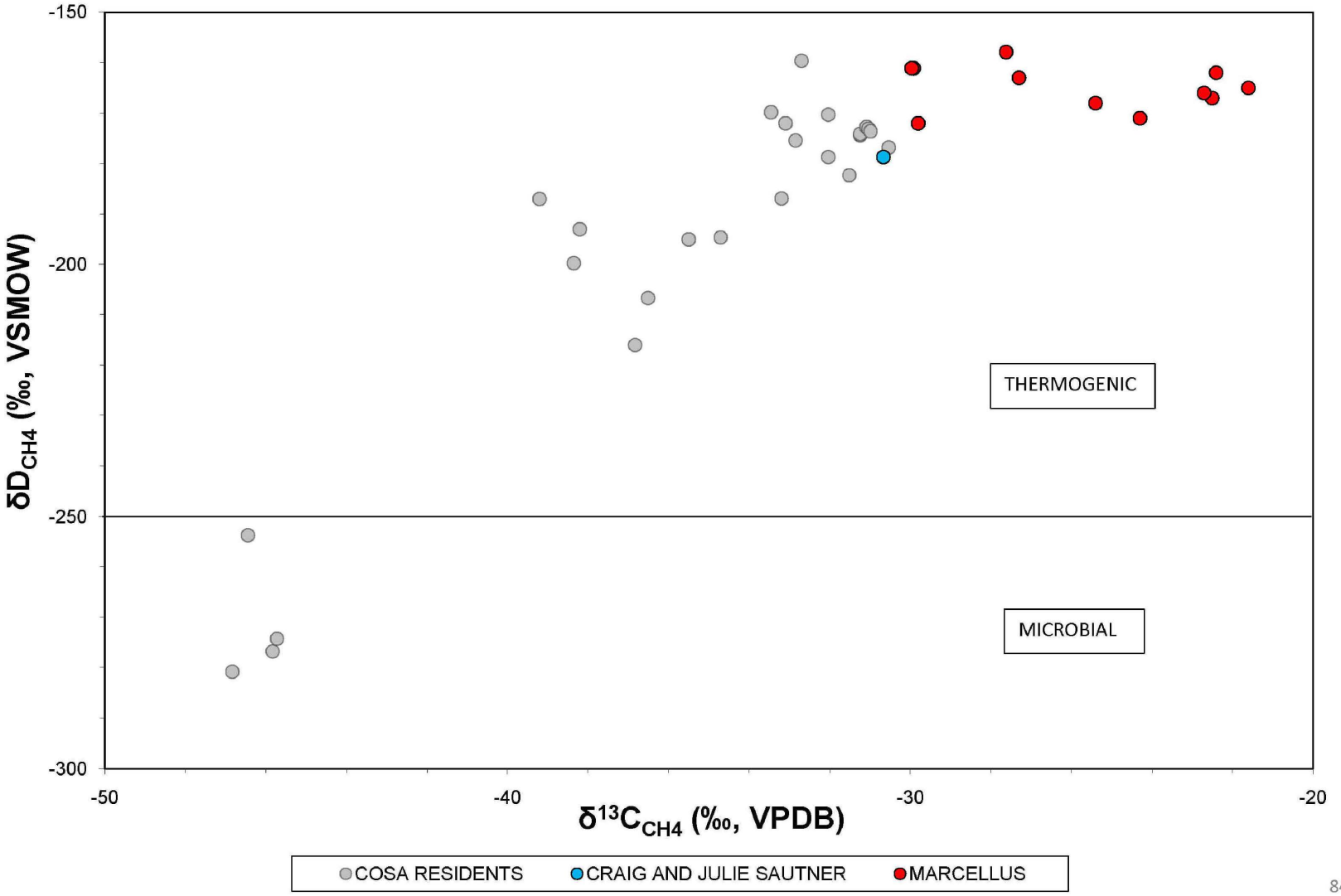
Sautner, Craig and Julie – Mn results



Sautner, Craig and Julie – pH results



Sautner, Craig and Julie – Isotopes



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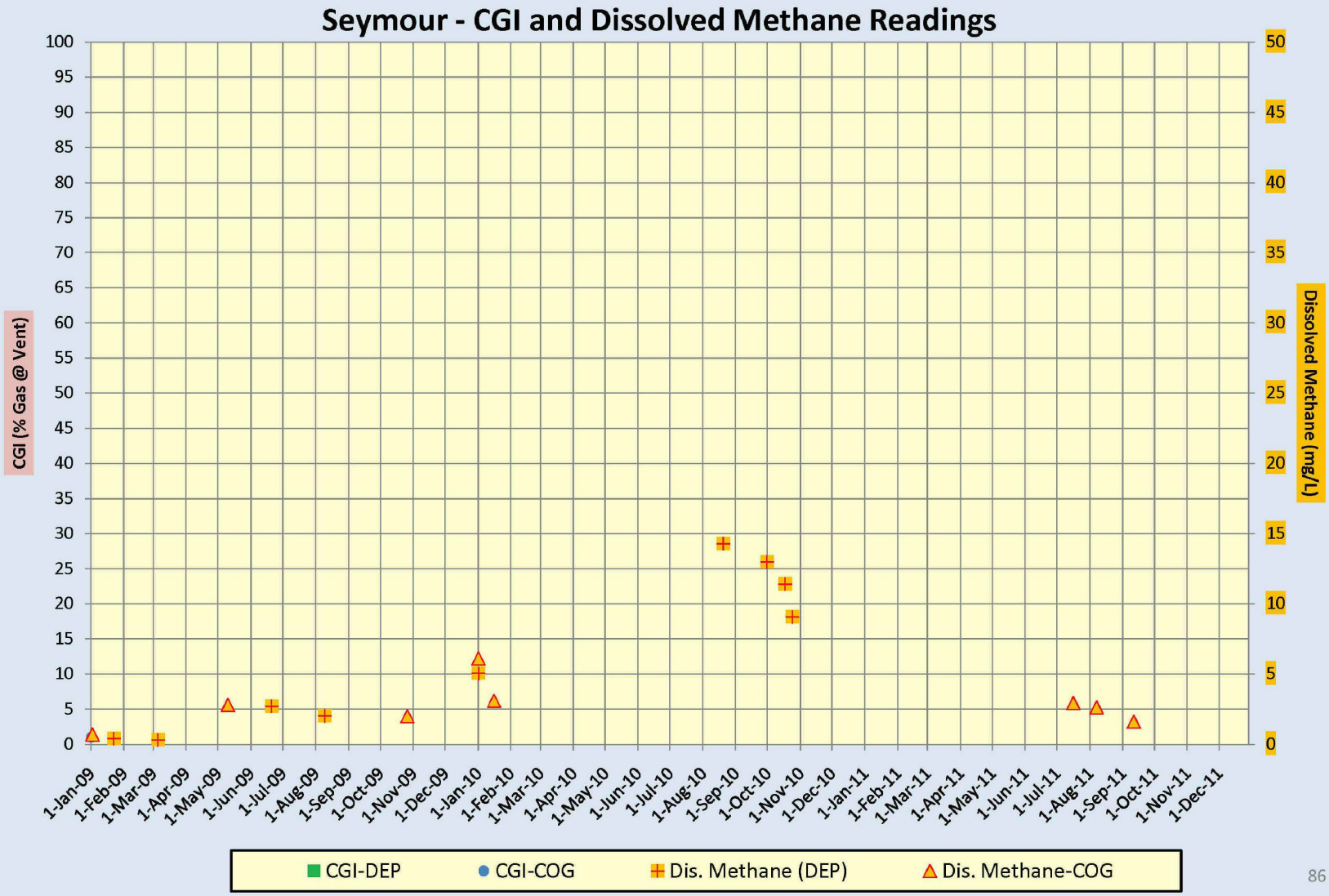
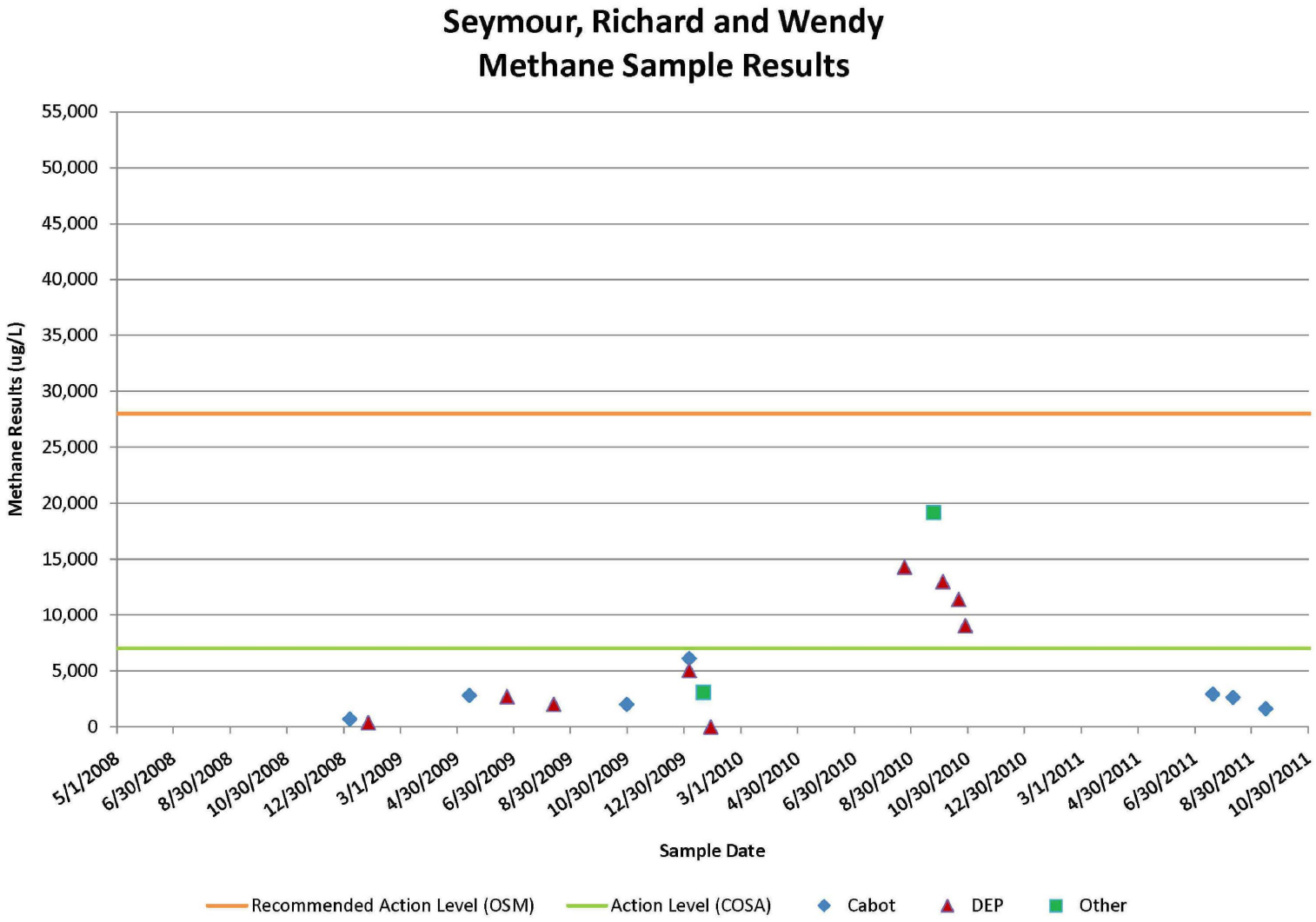
Seymour, Richard and Wendy – Water Well Summary

Water Well - Owner	Richard and Wendy Seymour
Exceed Primary:	Total and Fecal Coliform
Exceed Secondary:	Iron Manganese
Dissolved Gas:	Most Recent Result = 1.61 mg/L (9/15/2011)
Before Treatment:	N/A
After Treatment:	N/A
Gas Wells ≤ 1000':	None
Gas Wells 1000' - 2500':	Ely 2V, Lewis 2V Costello 1V, Ely 6H Lewis 1V, Ely 4V
Plan Forward:	Continue to monitor as per CO&SA. Offer treatment system.
Comments:	Receiving bottled and bulk water. Refused treatment system.

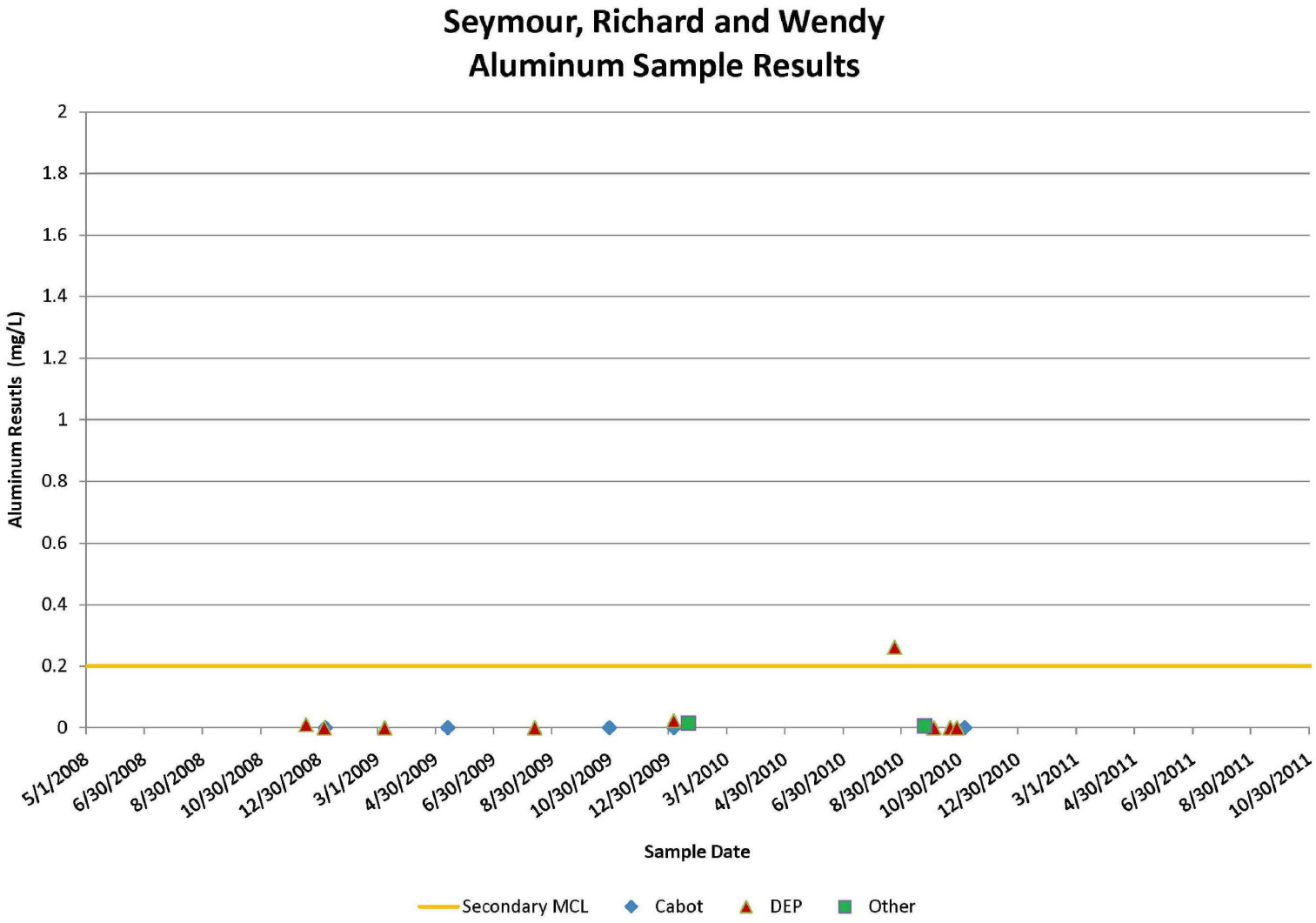
Seymour – CGI and Dissolved Methane Graphs



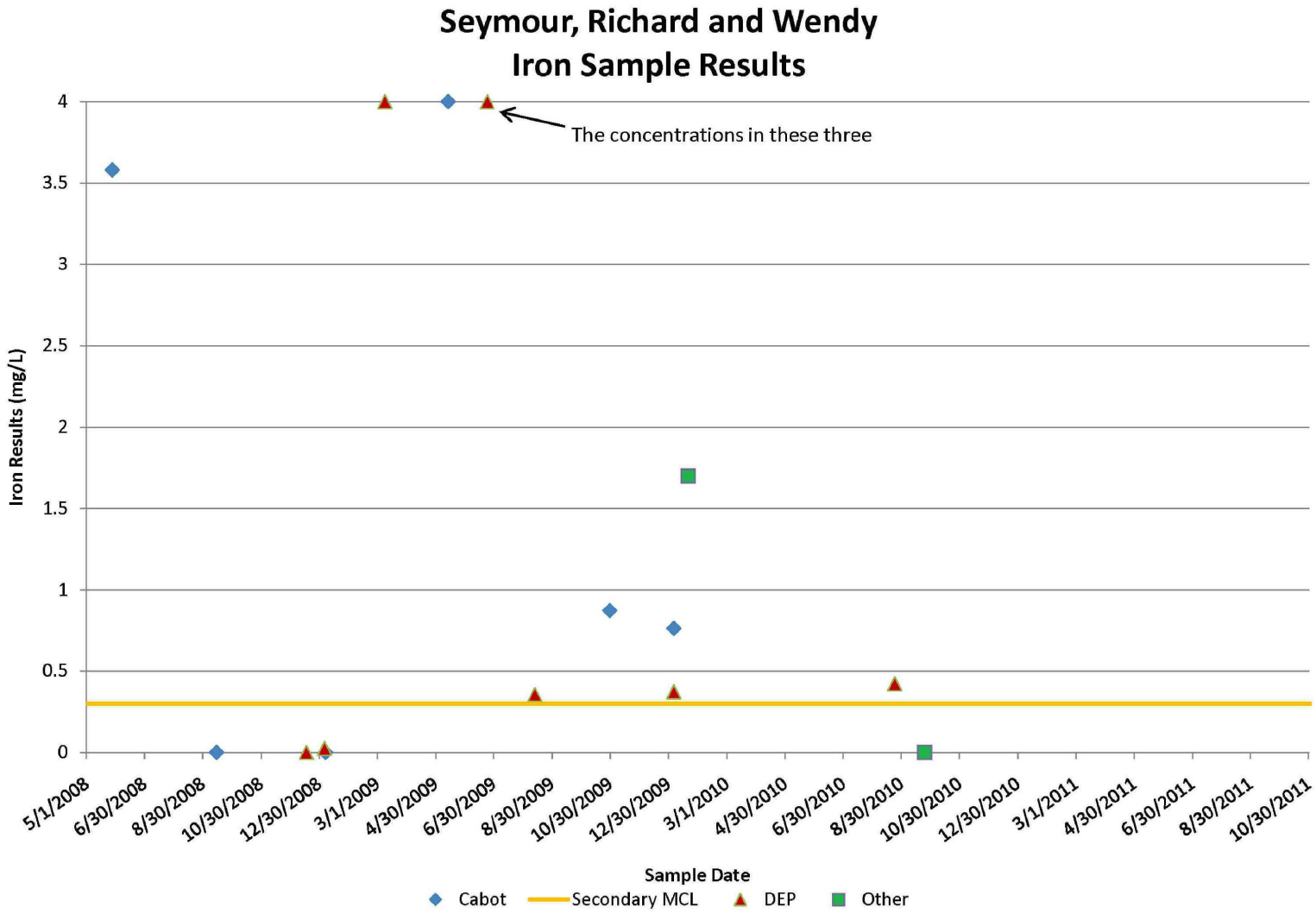
Seymour, Richard and Wendy – CH4 results



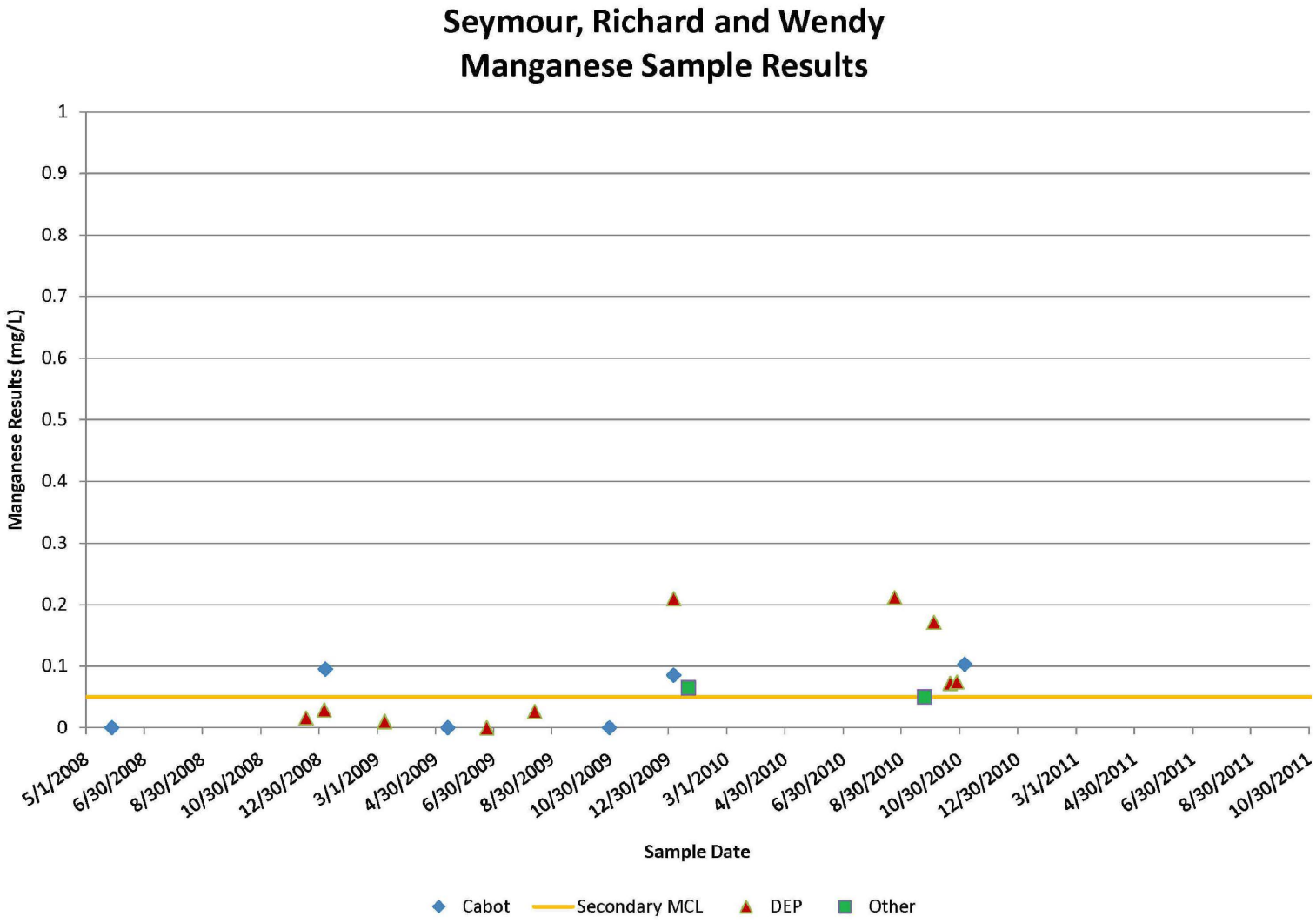
Seymour, Richard and Wendy – Al results



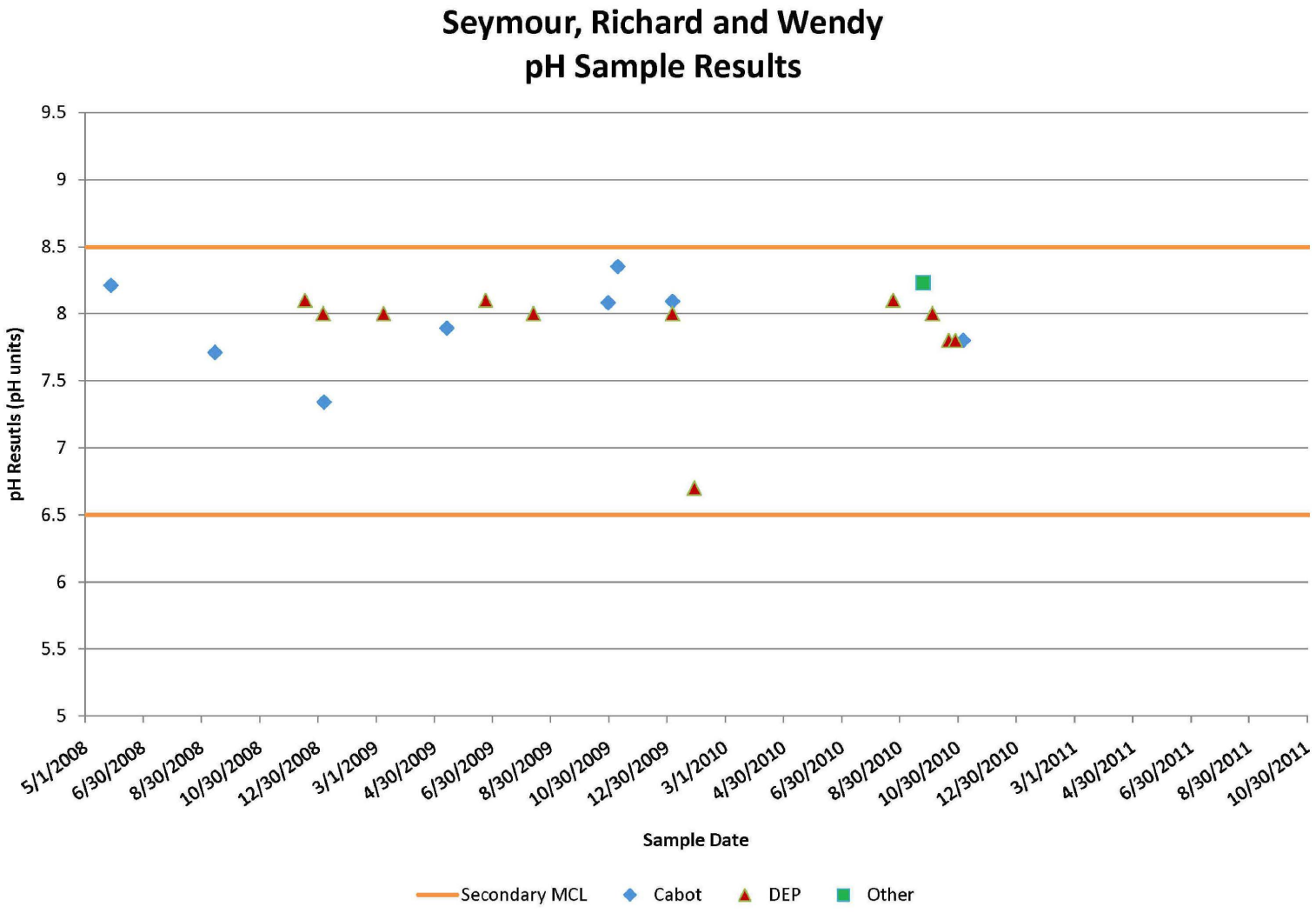
Seymour, Richard and Wendy – Fe results



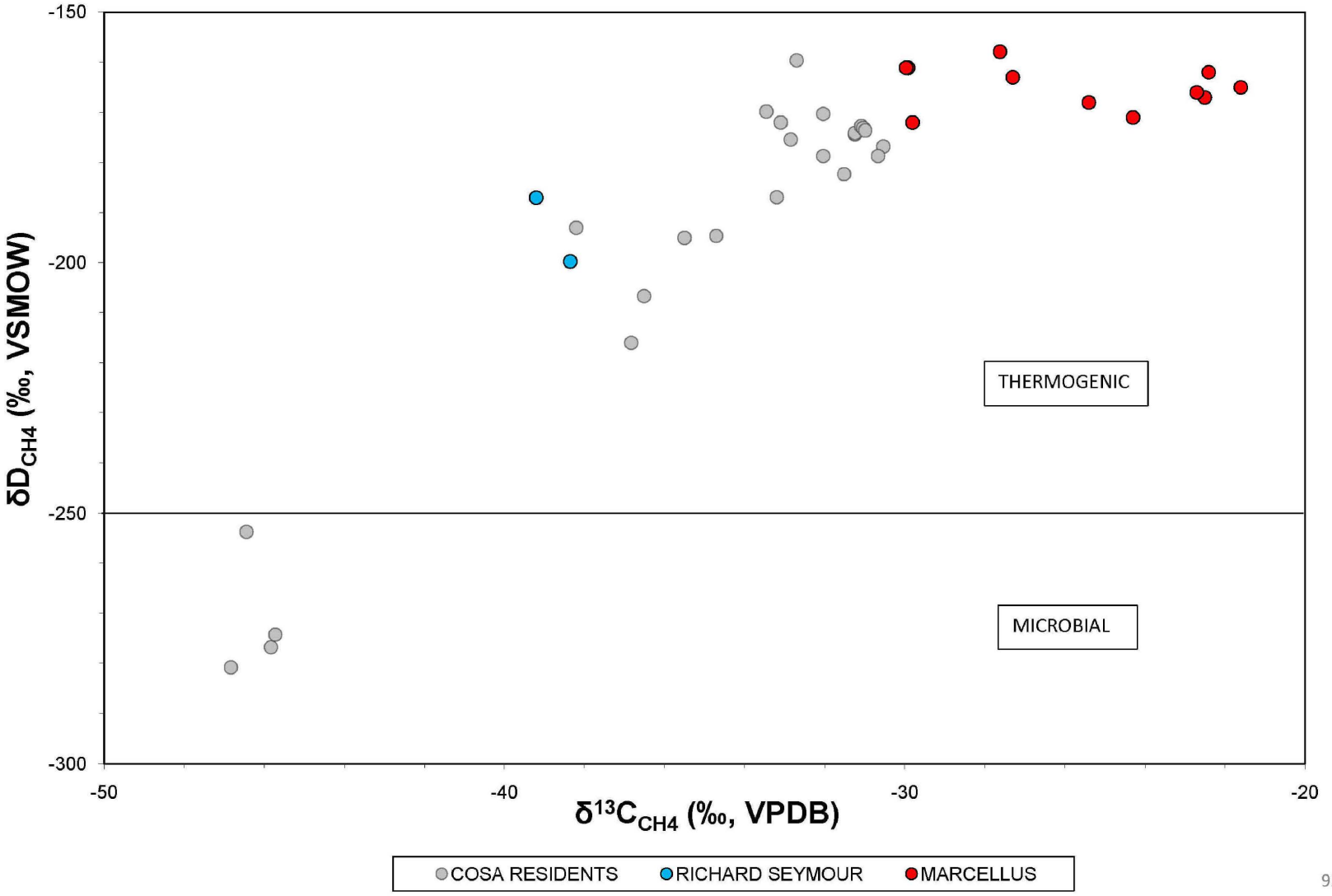
Seymour, Richard and Wendy – Mn results



Seymour, Richard and Wendy – pH results



Seymour, Richard and Wendy – Isotopes



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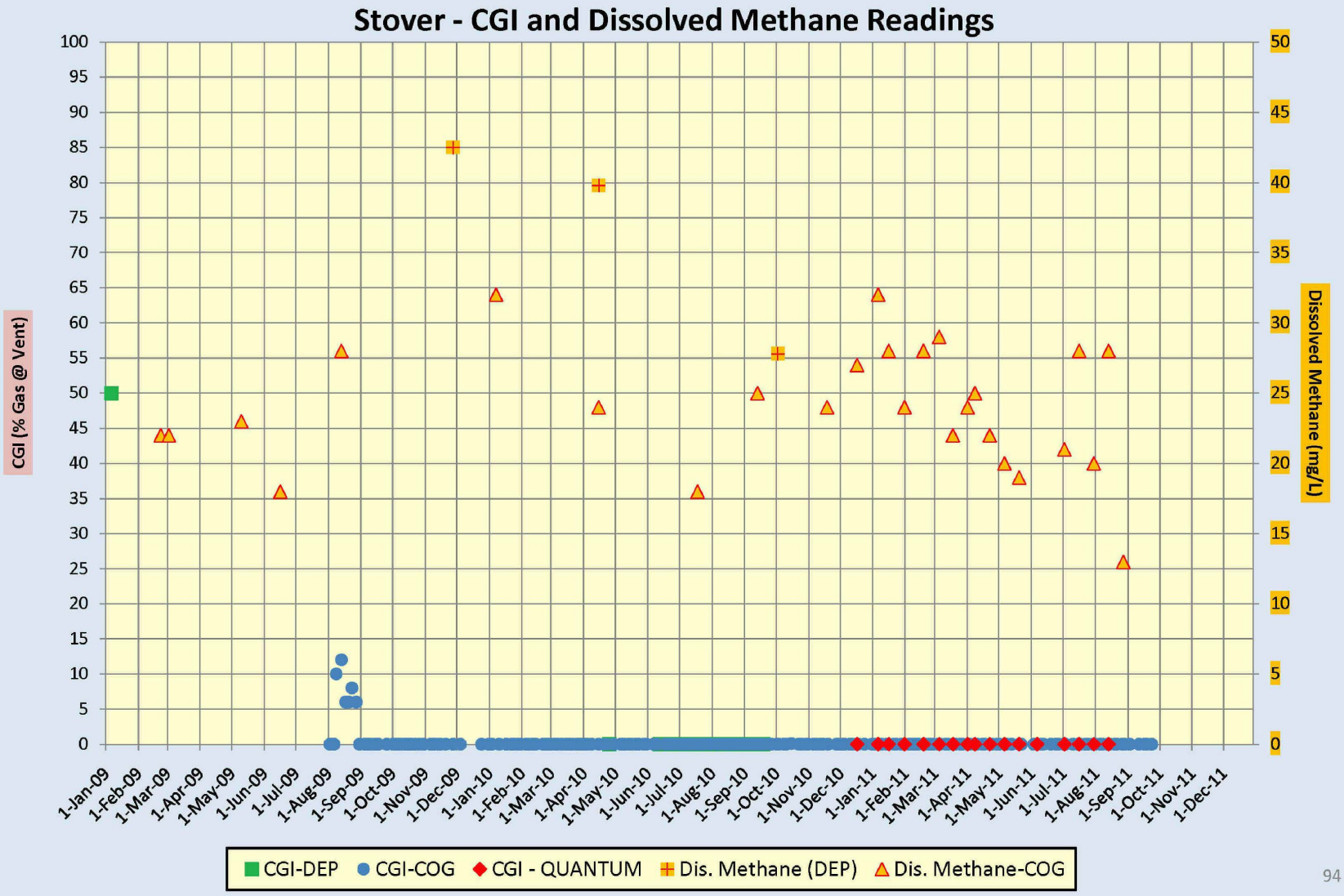
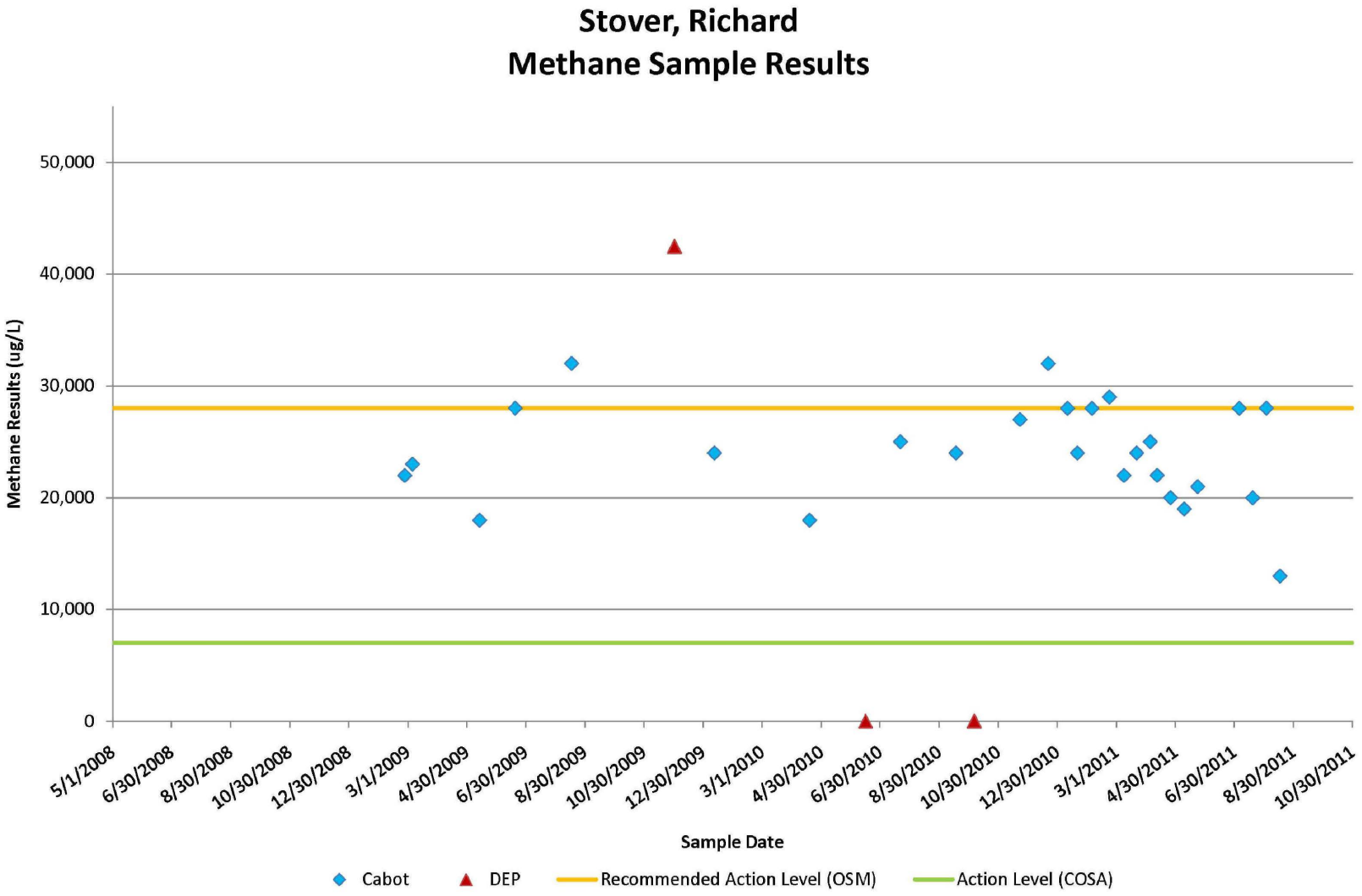
Stover, Richard – Water Well Summary

Water Well - Owner	Richard Stover
Exceed Primary:	Barium
Exceed Secondary:	Manganese
Dissolved Gas:	Most Recent Result = 13 mg/L (08/31/11)
Before Treatment:	Data not yet available.
After Treatment:	Data not yet available.
	System installed August 2011
Gas Wells ≤ 1000':	None
Gas Wells 1000' - 2500':	Ratzel 1H Ratzel 3V Ratzel 2H
Plan Forward:	Continue to monitor as per CO&SA.
Comments:	Received escrow funds. Installed treatment system and RO system. Not primary residence.

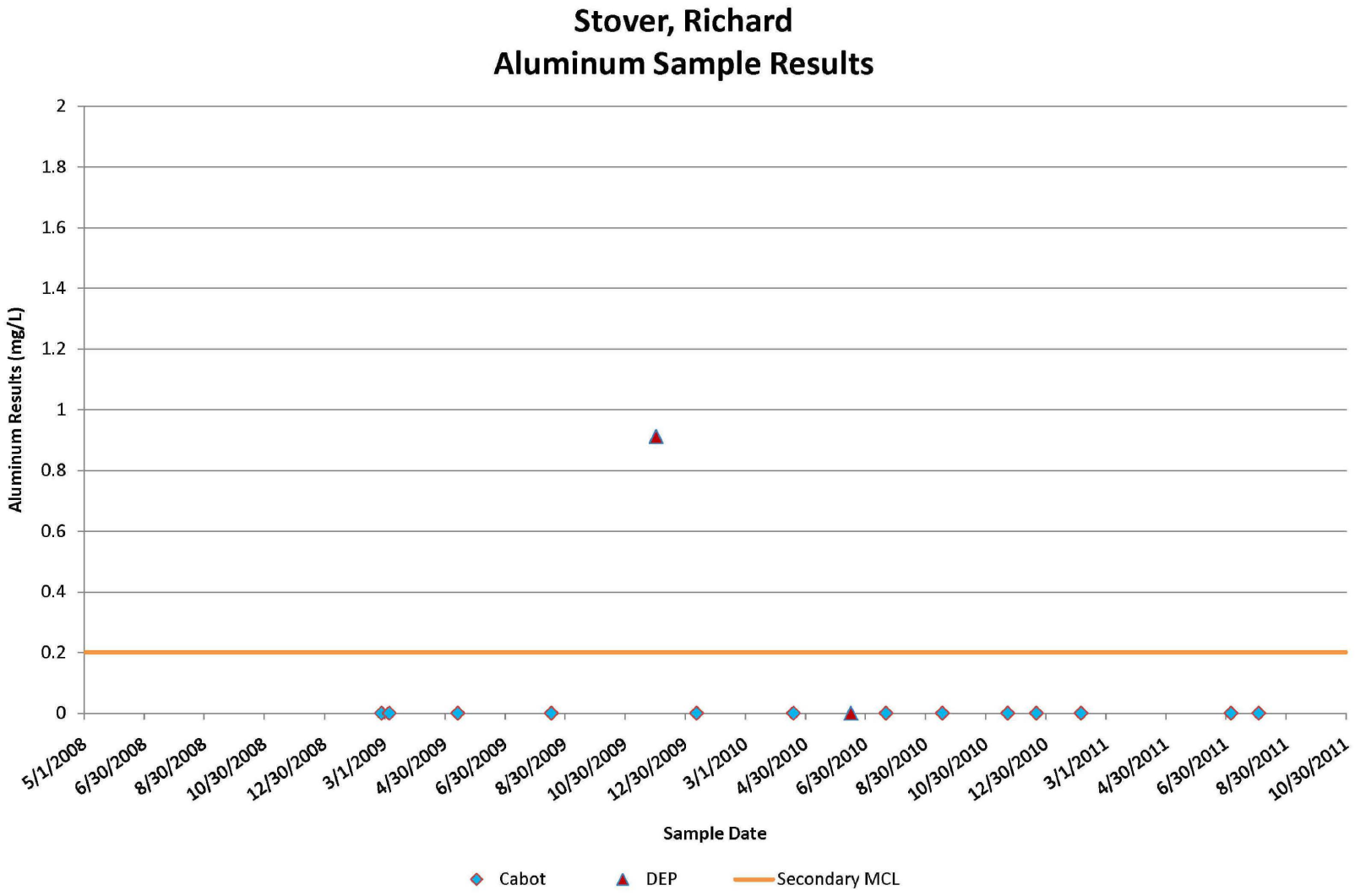
Stover – CGI and Dissolved Methane Graphs



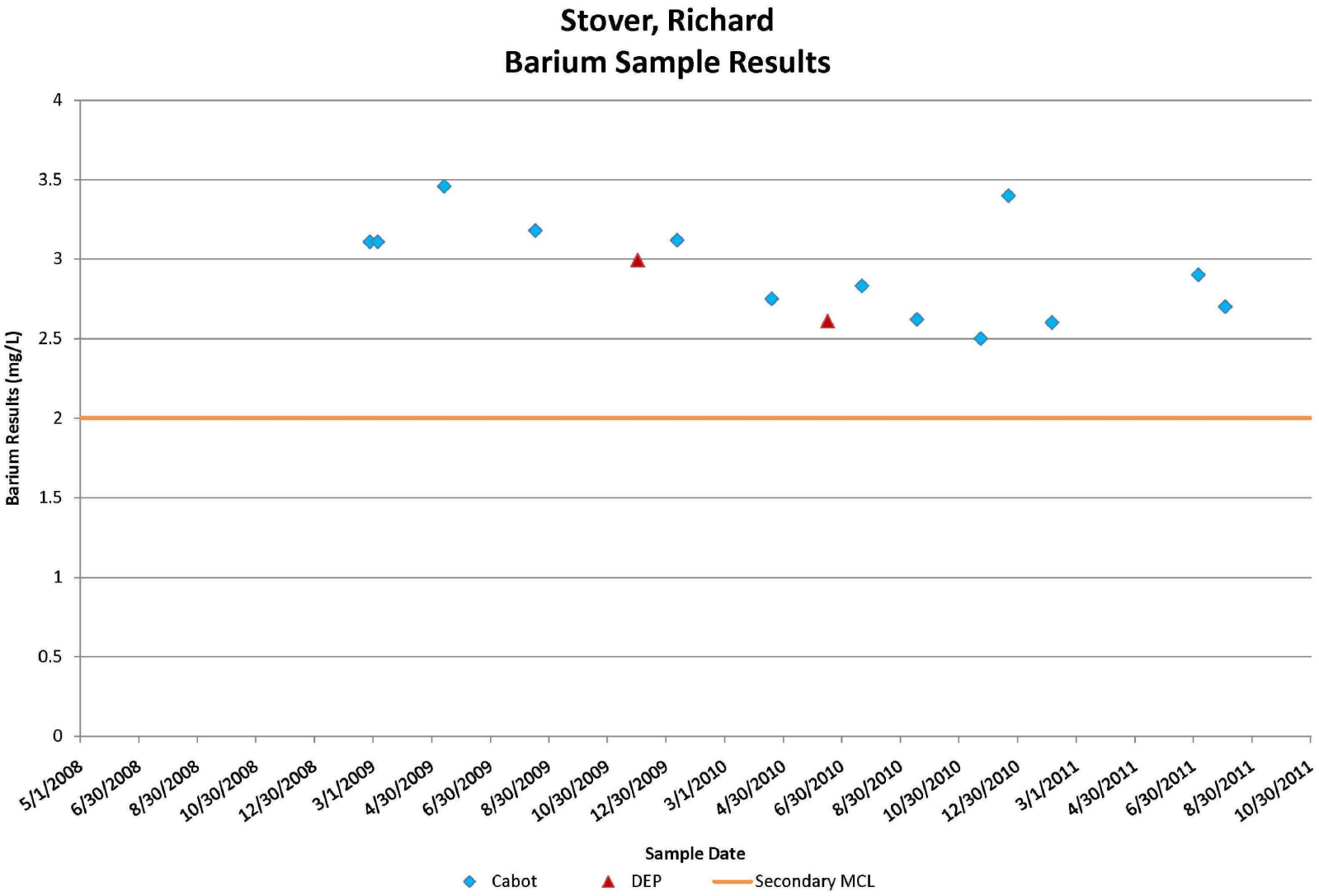
Stover, Richard – CH4 results



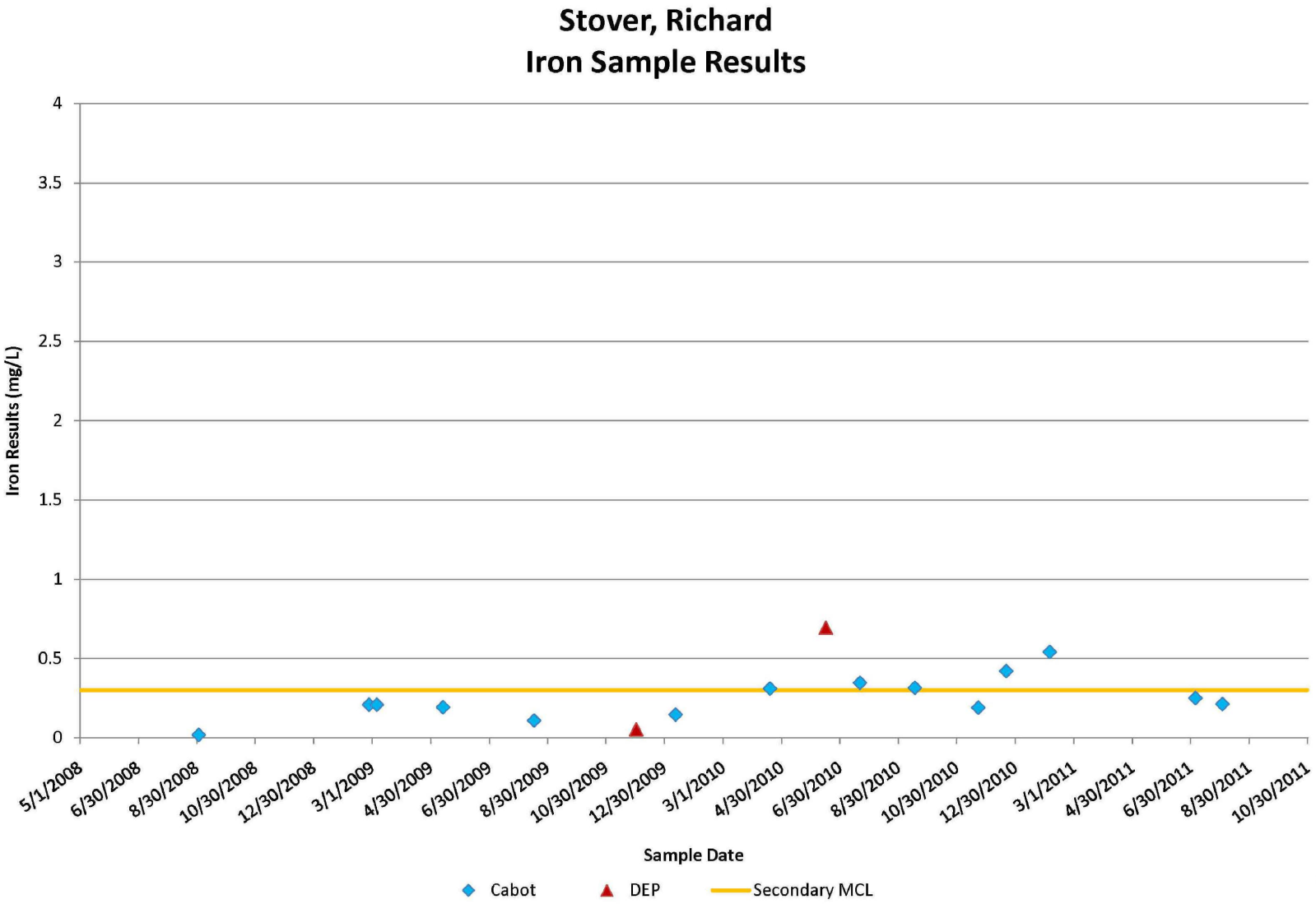
Stover, Richard – Al results



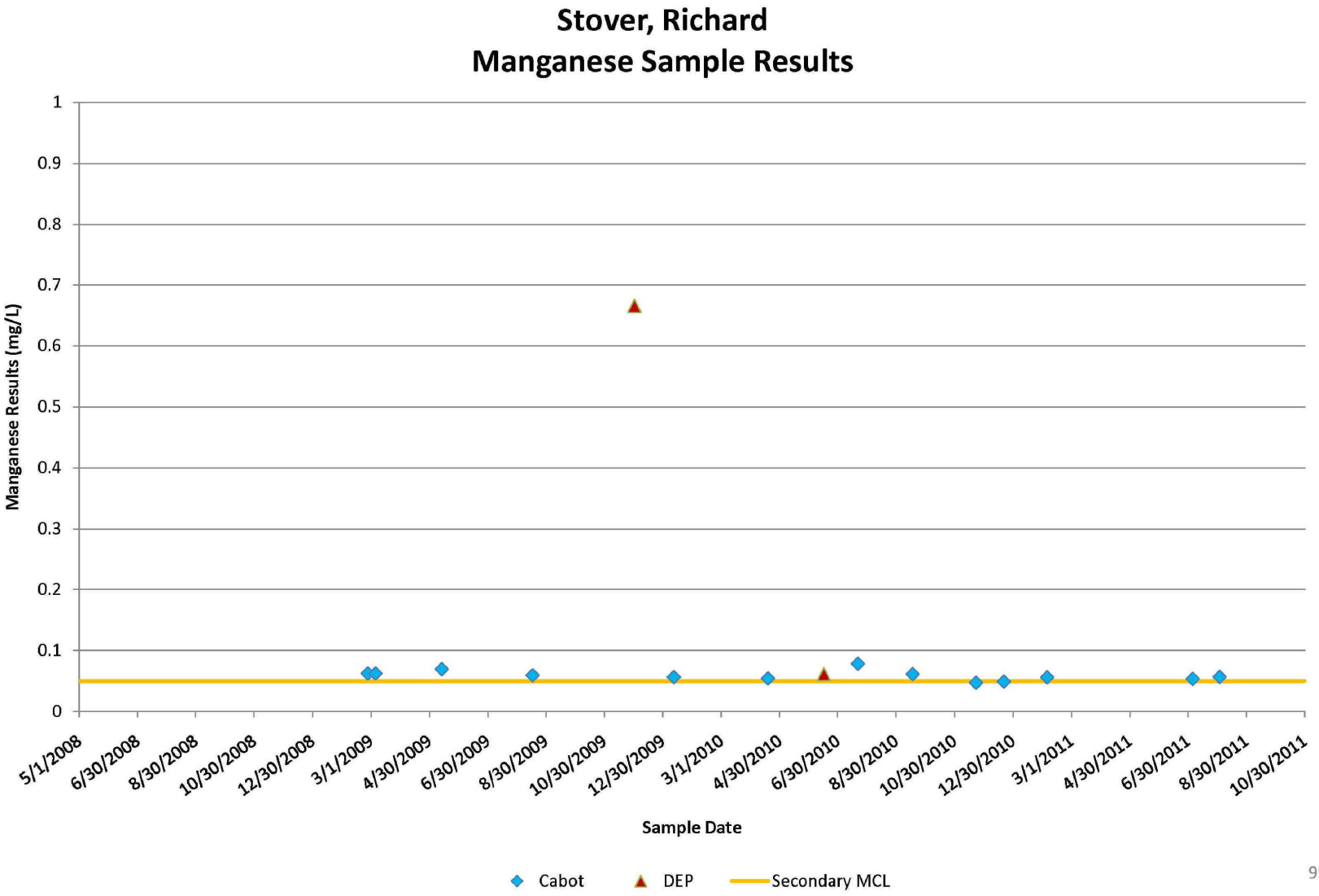
Stover, Richard – Ba results



Stover, Richard – Fe results



Stover, Richard – Mn results



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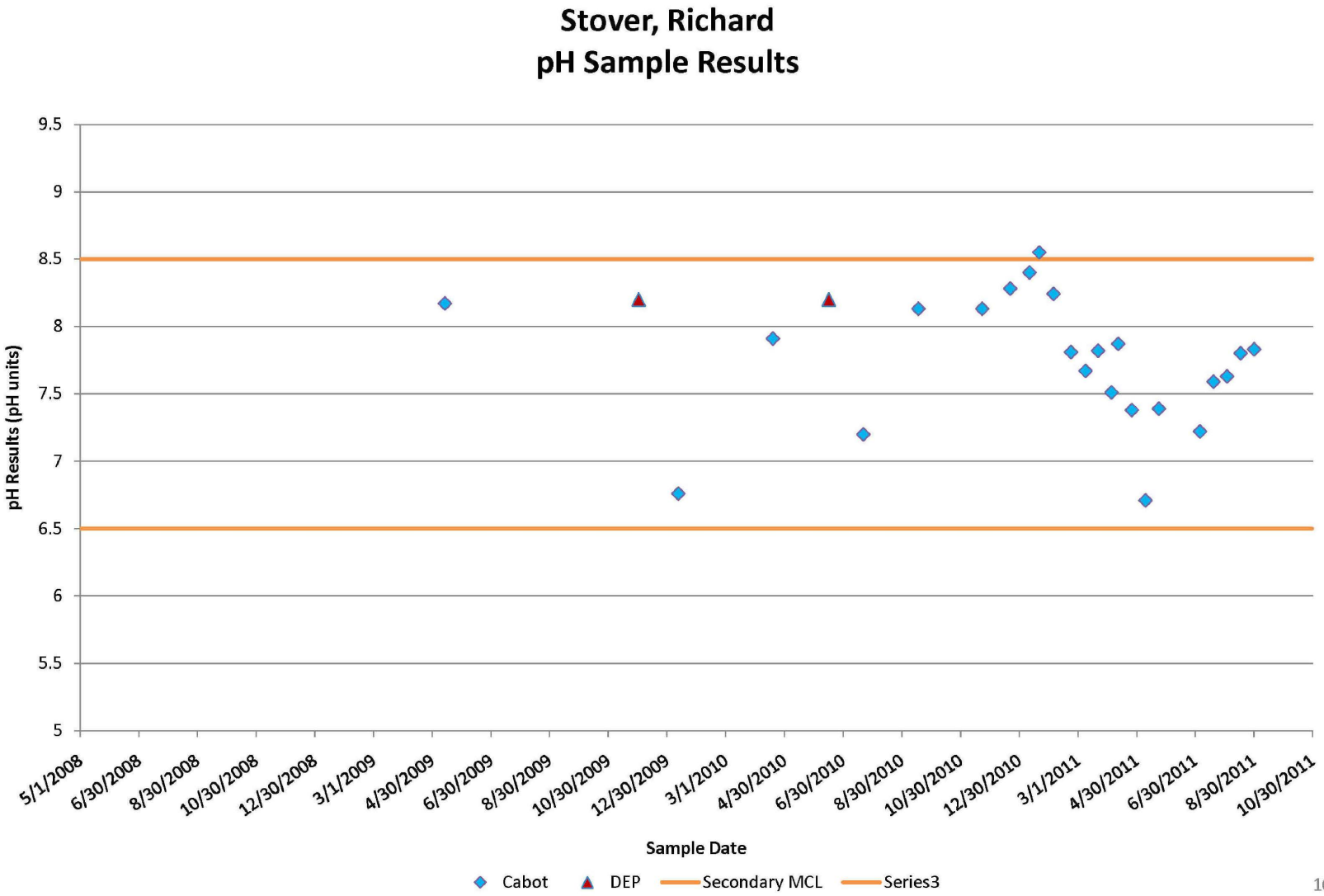
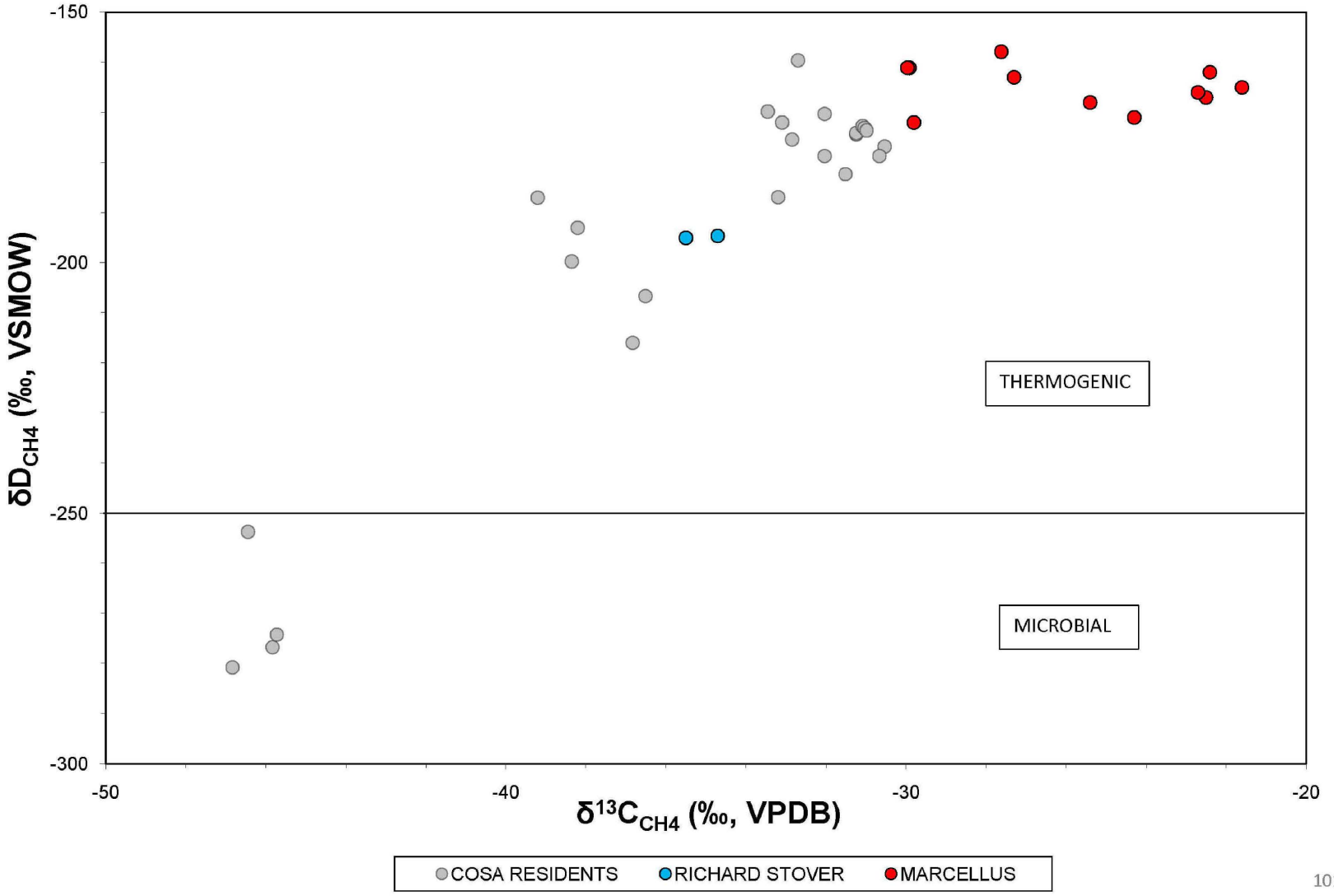
Stover, Richard – pH results



Stover, Richard – Isotopes



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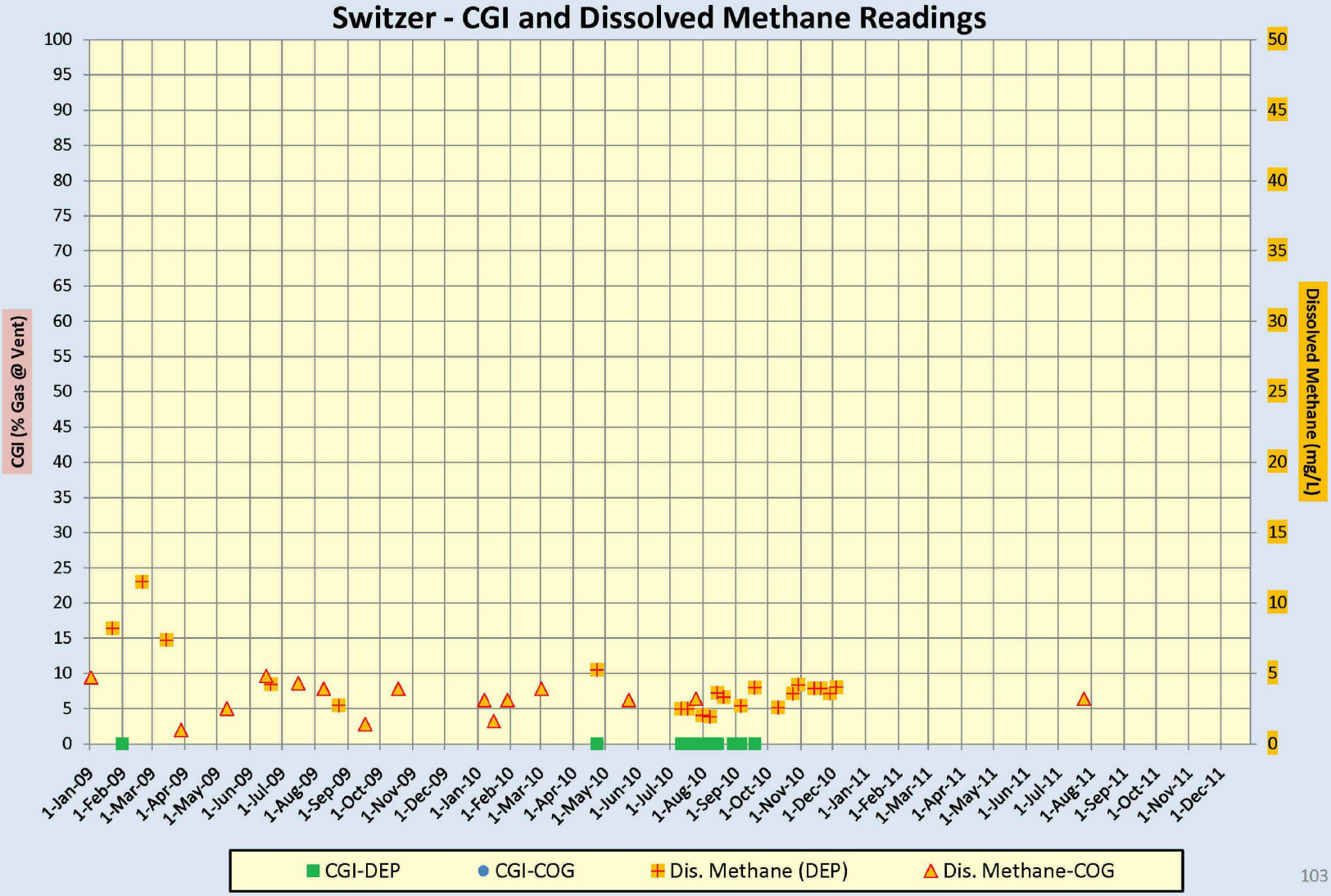
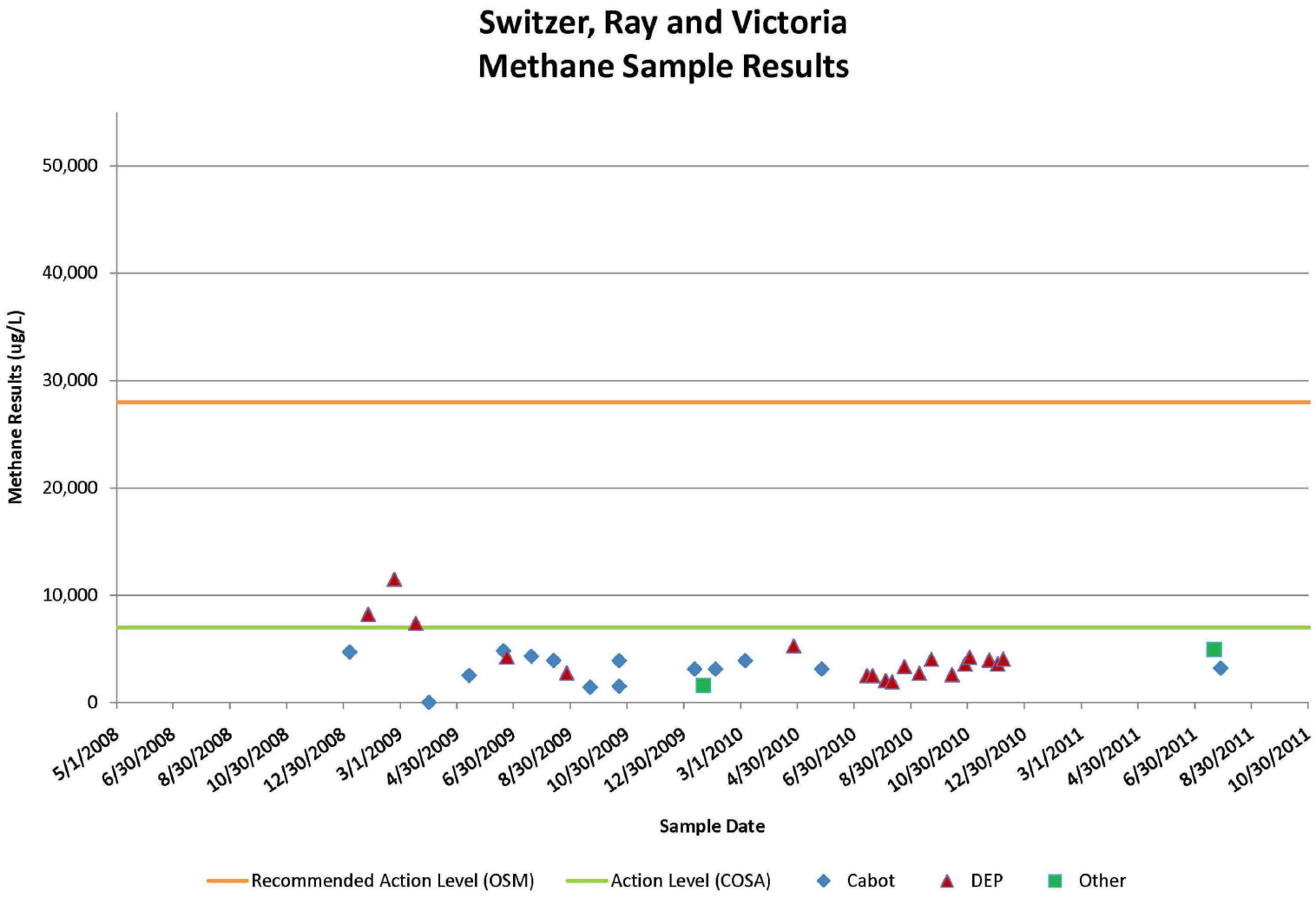
Switzer, Jimmy and Victoria – Water Well Summary

Water Well - Owner	Jimmy and Victoria Switzer
Exceed Primary:	None
Exceed Secondary:	pH
Dissolved Gas:	Most Recent Result = 3.18 mg/L (07/29/11)
Before Treatment:	N/A
After Treatment:	N/A
Gas Wells ≤ 1000':	Lewis 2V
Gas Wells 1000' - 2500':	Costello 1V, Ely 2V, Ely 4V, Ely 6H, Lewis 1V
Plan Forward:	Offer treatment system.
Comments:	Receiving bottled water. Refusing to allow sampling. Refused treatment system. 75/2X Rule per COSA not exceeded since 2/23/09.

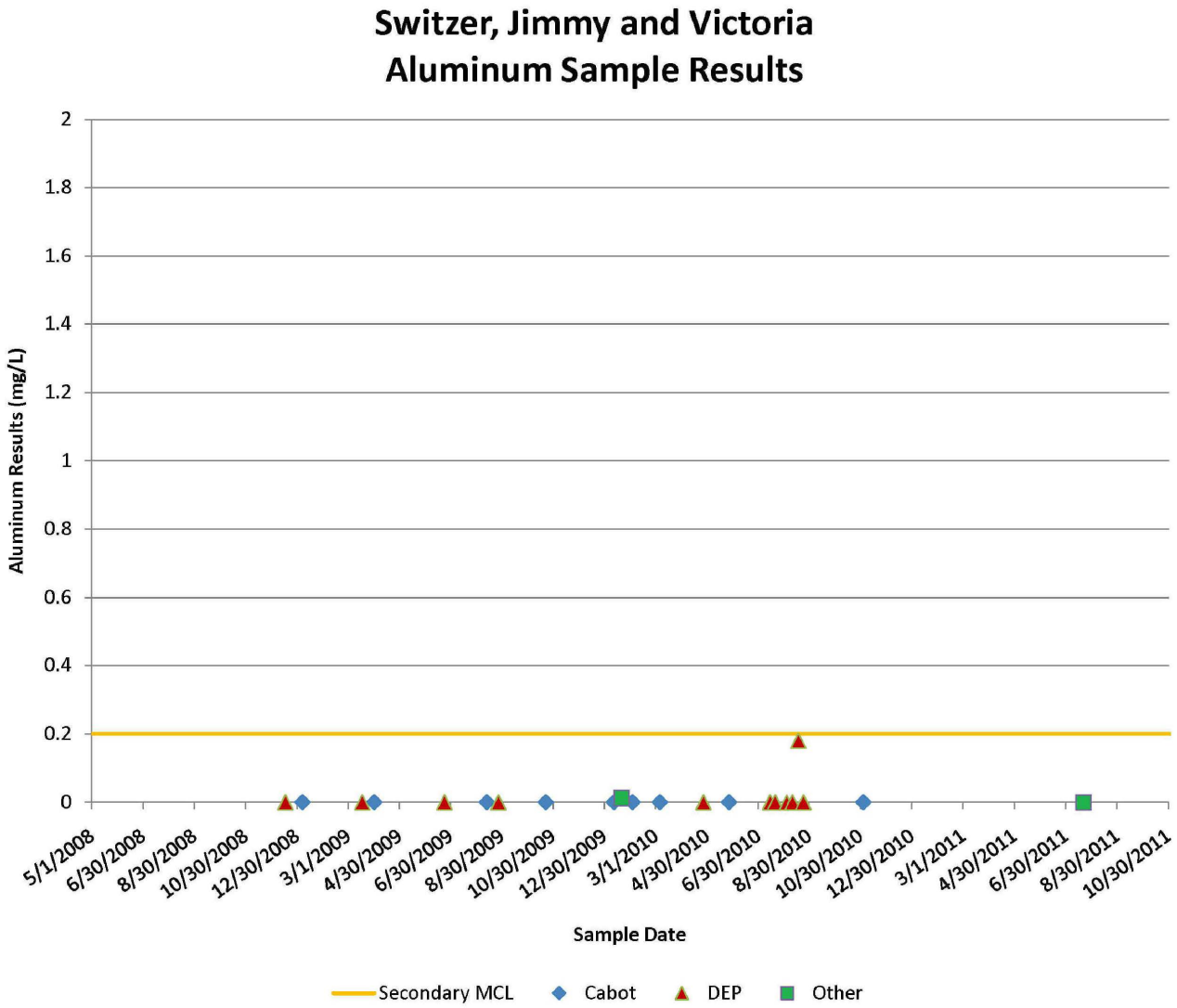
Switzer – CGI and Dissolved Methane Graphs



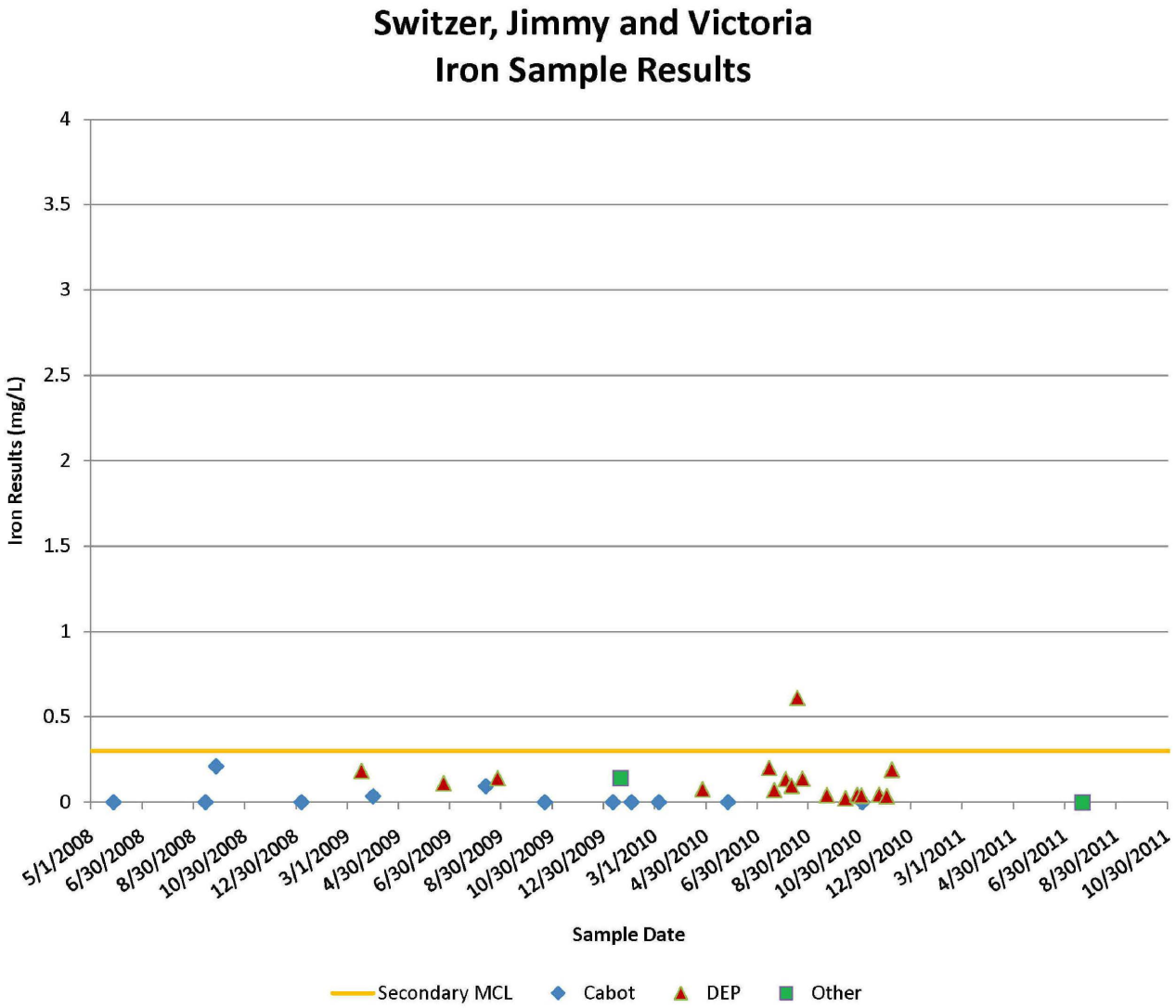
Switzer, Jimmy and Victoria – CH4 results



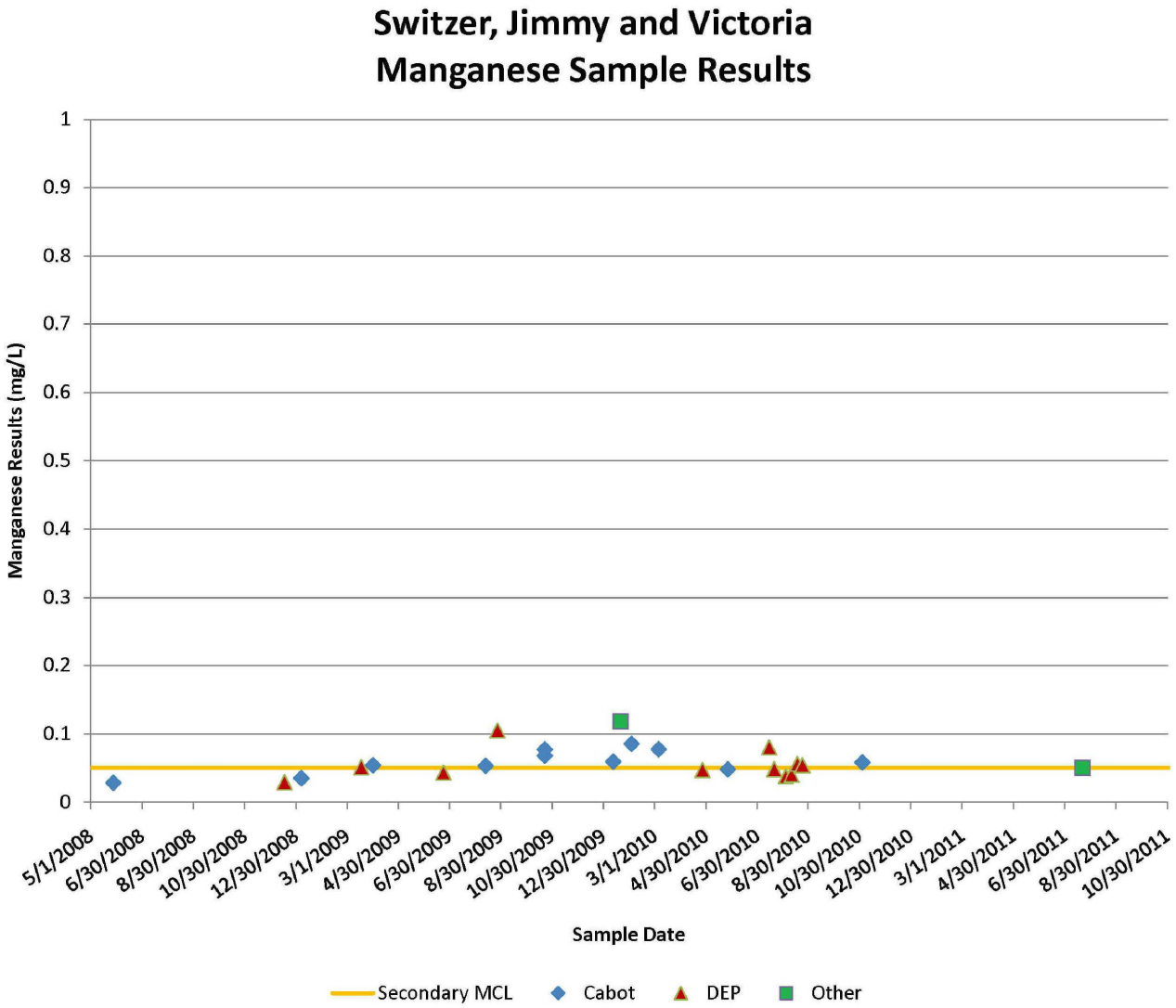
Switzer, Jimmy and Victoria – Al results



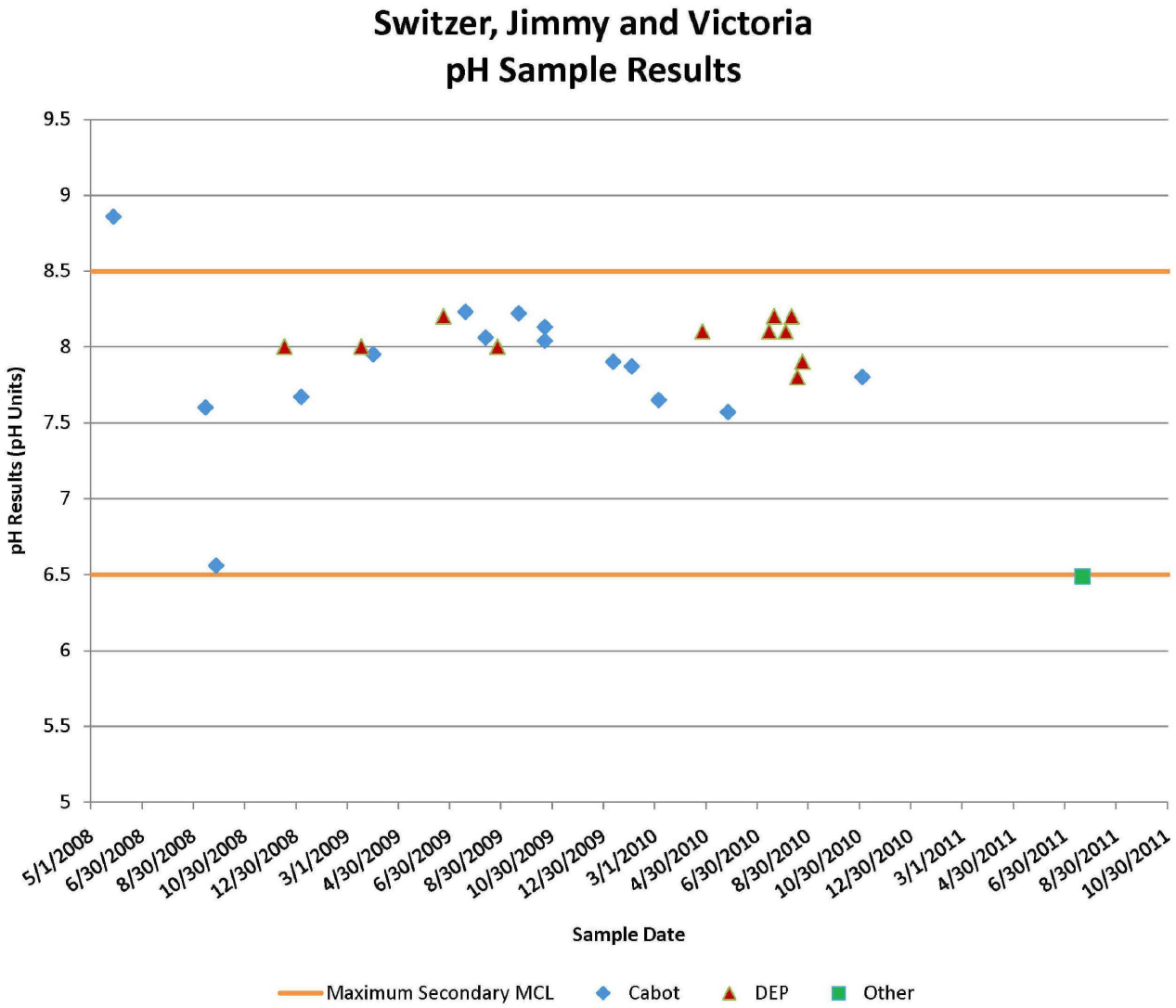
Switzer, Jimmy and Victoria – Fe results



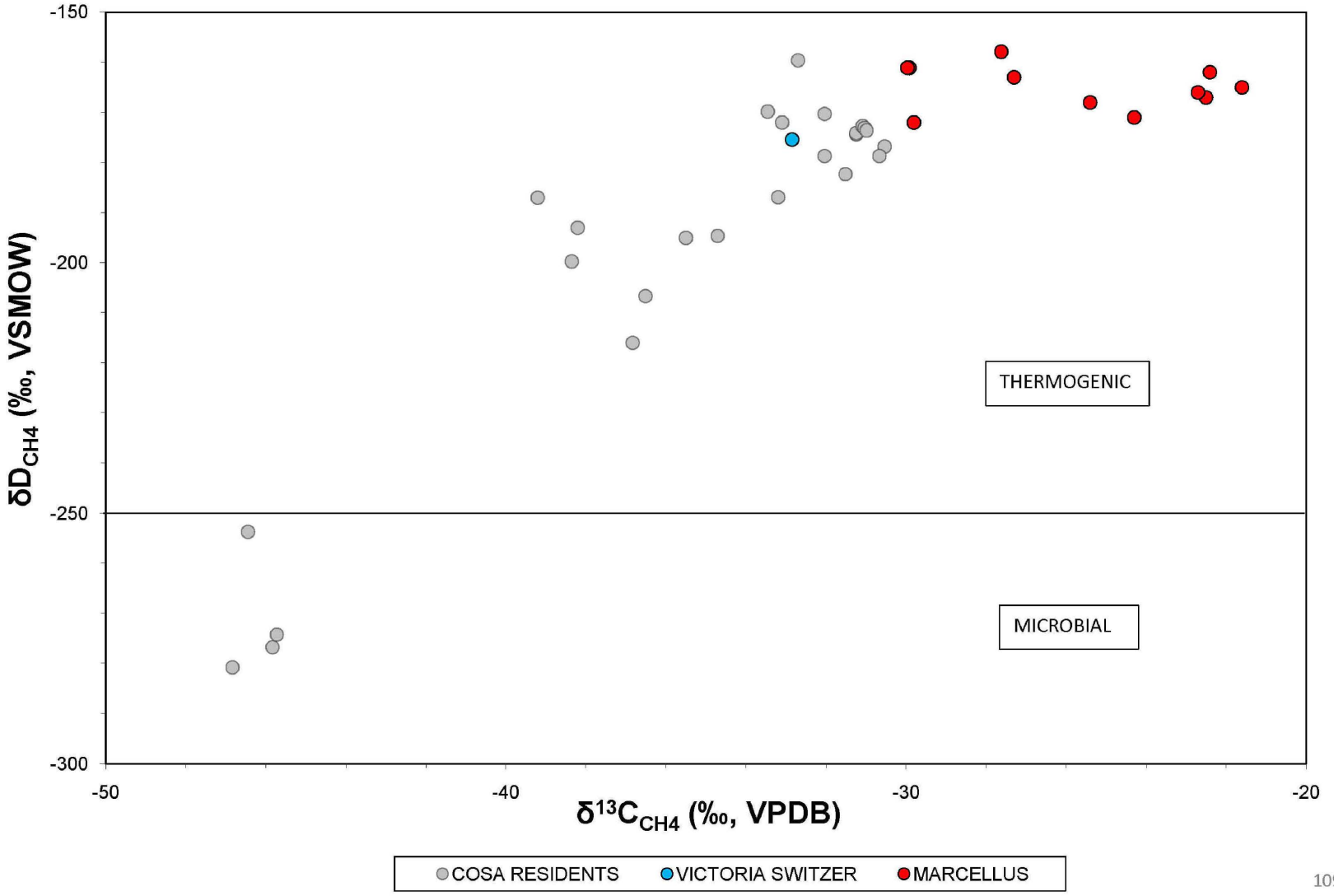
Switzer, Jimmy and Victoria – Mn results



Switzer, Jimmy and Victoria – pH results



Switzer, Jimmy and Victoria – Isotopes



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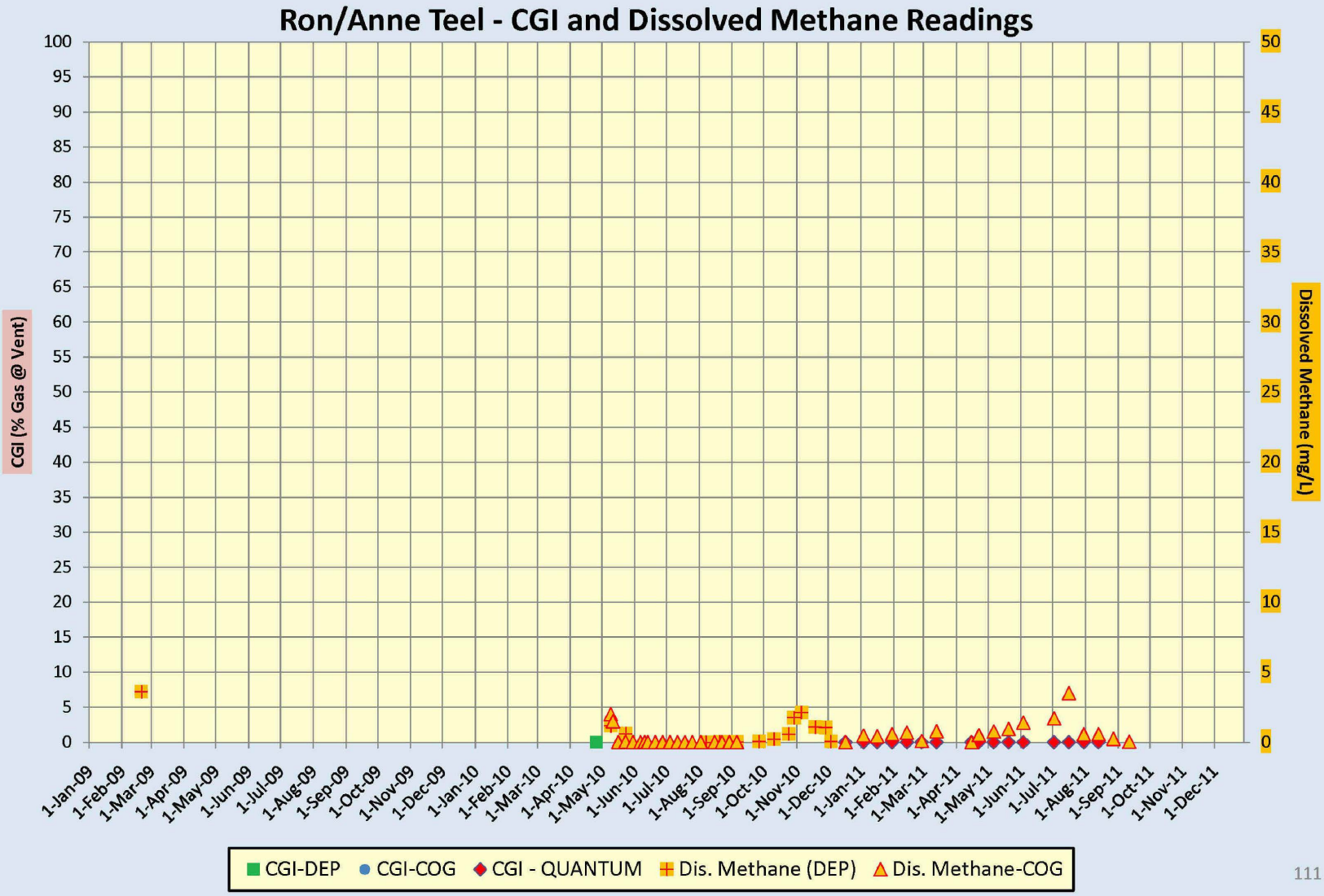
DIM0038546

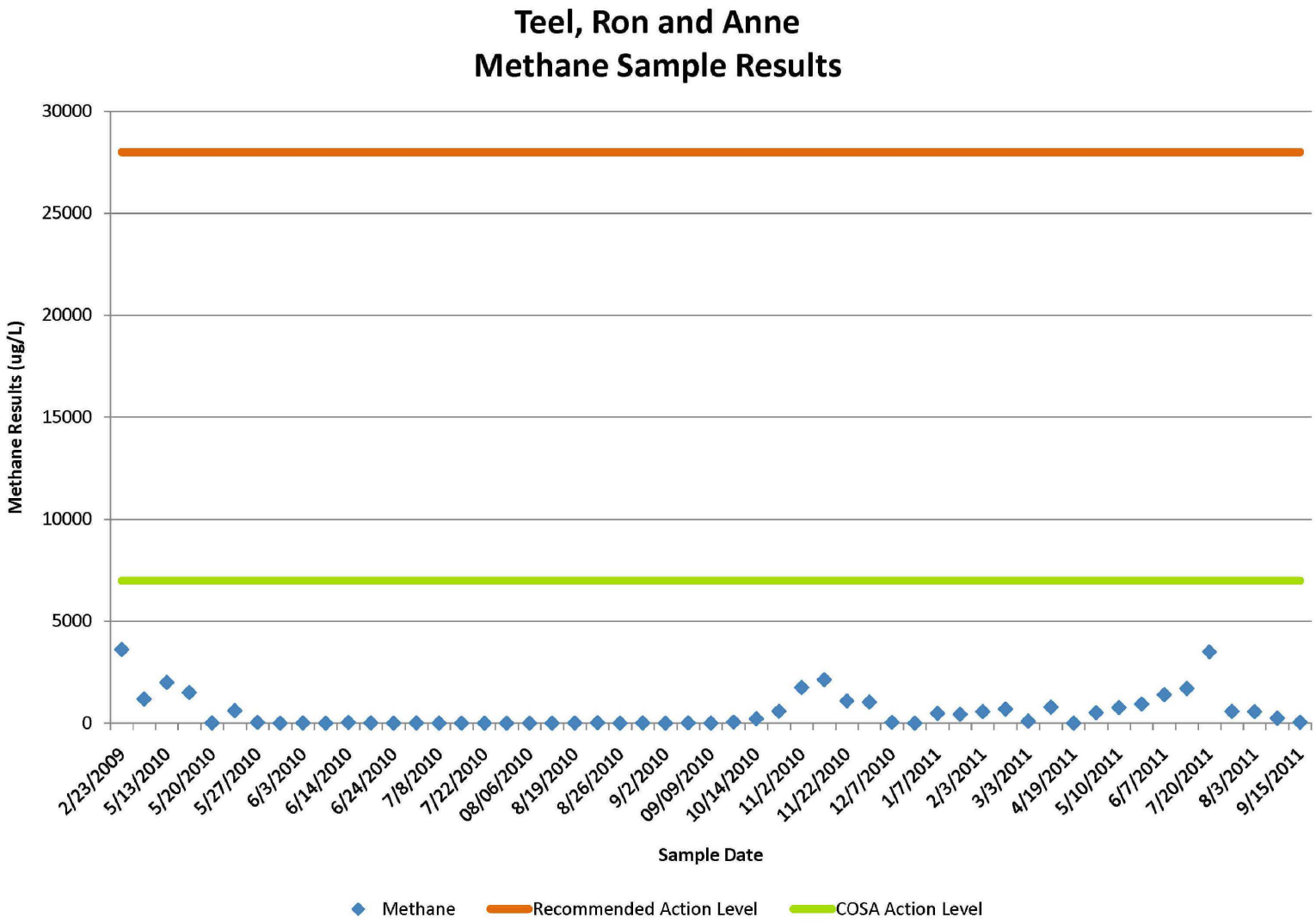
Teel, Ron and Anne – Water Well Summary

Water Well - Owner	Ronald and Anne Teel
Exceed Primary:	None
Exceed Secondary:	None
Dissolved Gas:	Most recent result = 0.04 mg/L (09/15/11)
Before Treatment:	N/A
After Treatment:	N/A
	The Teel's have accepted a treatment system, but have elected to store the system and not install it.
Gas Wells ≤ 1000':	Lewis 2V
Gas Wells 1000' - 2500':	Ely 4V Ely 6H Lewis 1V Rozanksi 1 Teel 2V
Plan Forward:	Continue to monitor as per CO&SA.
Comments:	Received escrow funds. Never had a methane concentration above 7 mg/L. Treatment system received, but not installed.

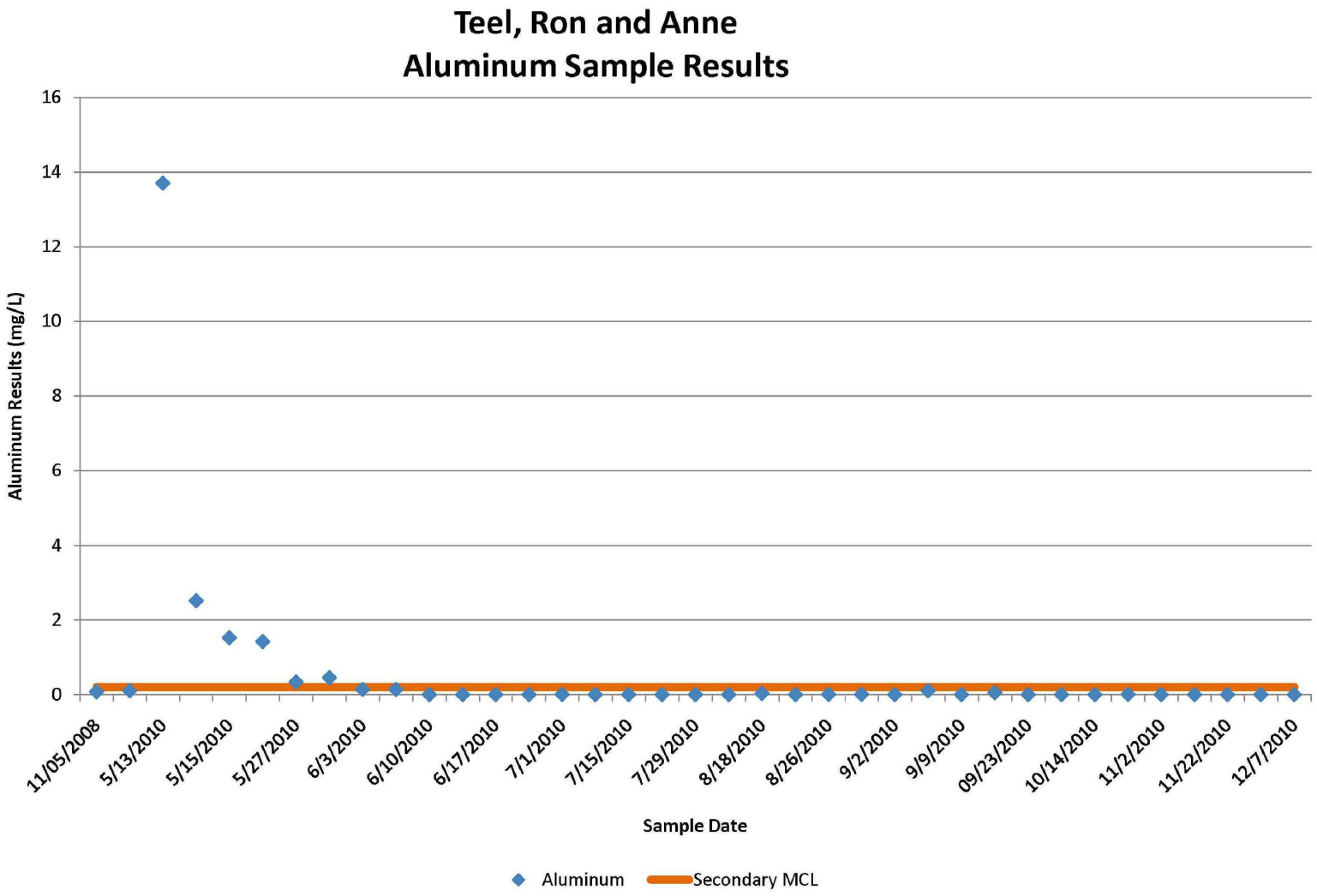
Teel – CGI and Dissolved Methane Graphs



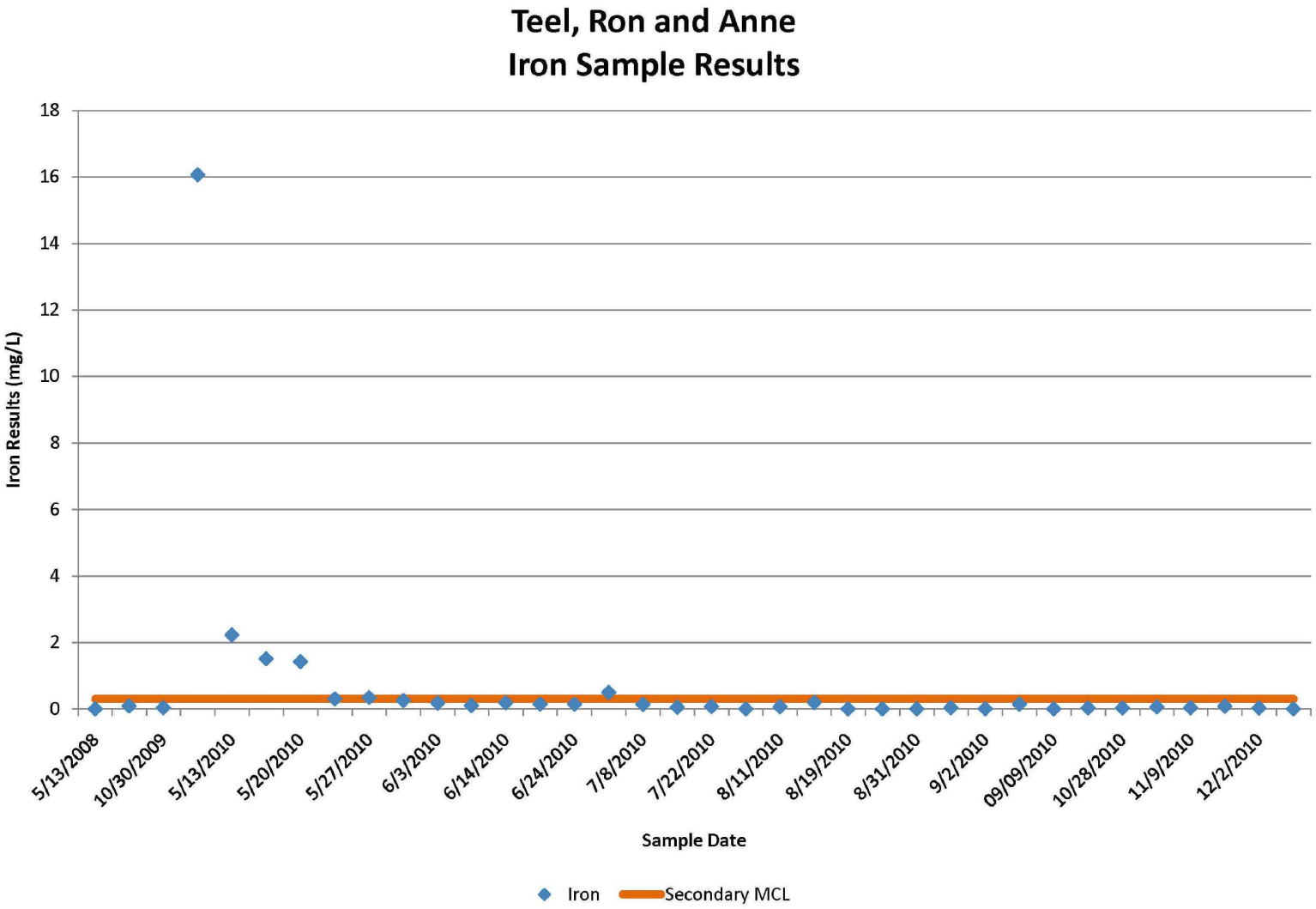
Teel, Ron and Anne – CH4 results



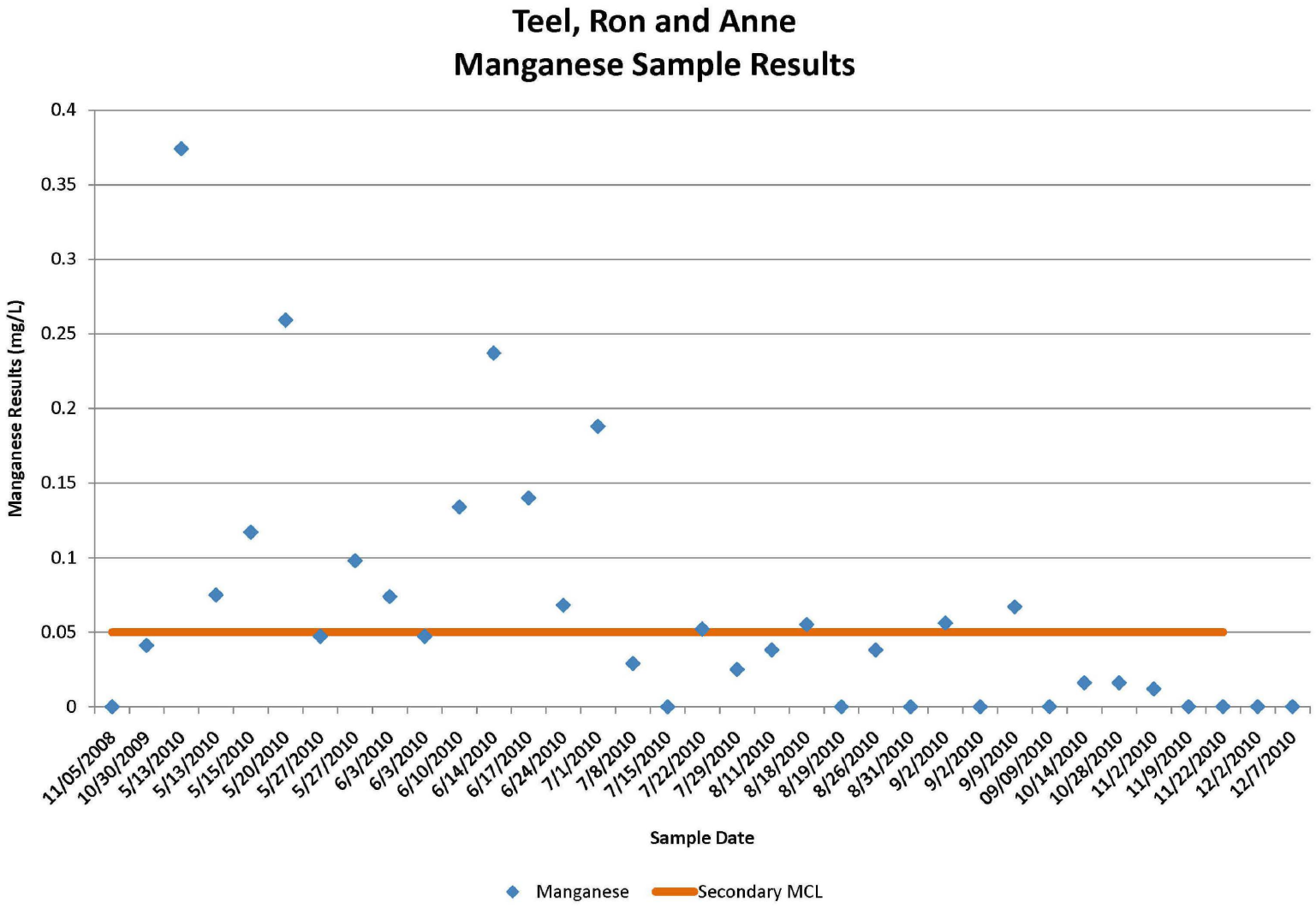
Teel, Ron and Anne – Al results



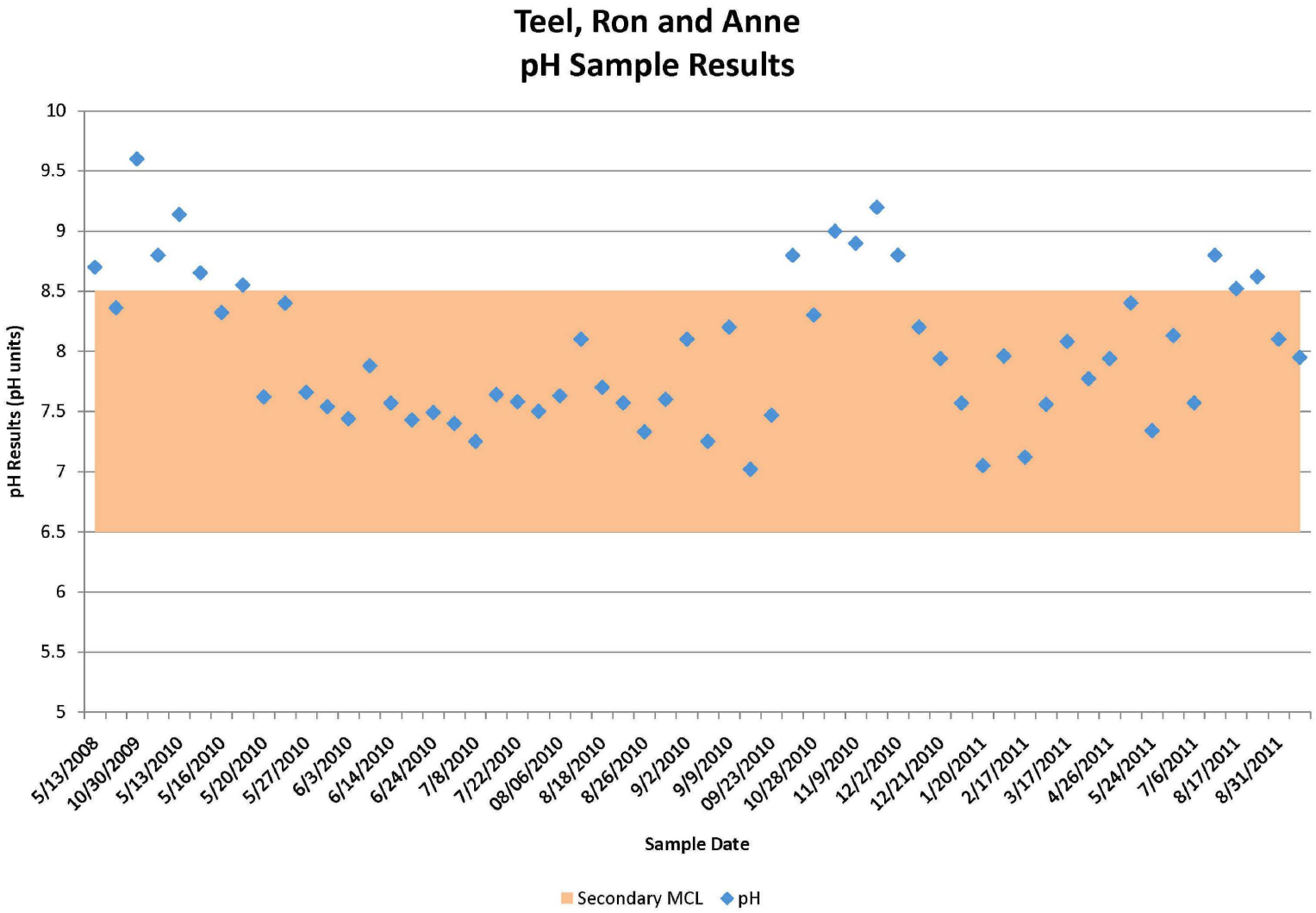
Teel, Ron and Anne – Fe results



Teel, Ron and Anne – Mn results



Teel, Ron and Anne – pH results



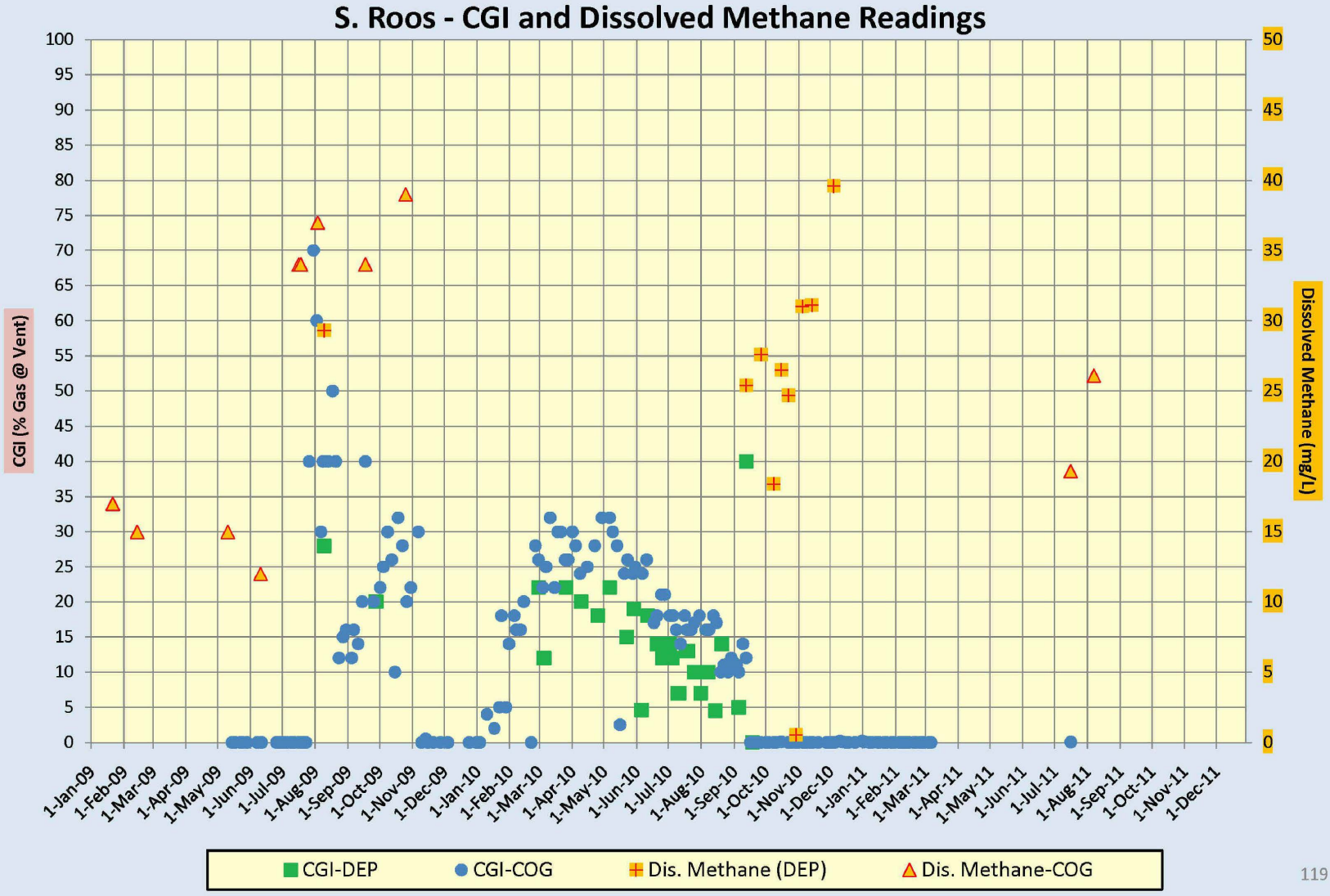
Group B (1 water well)

Biogenic gas

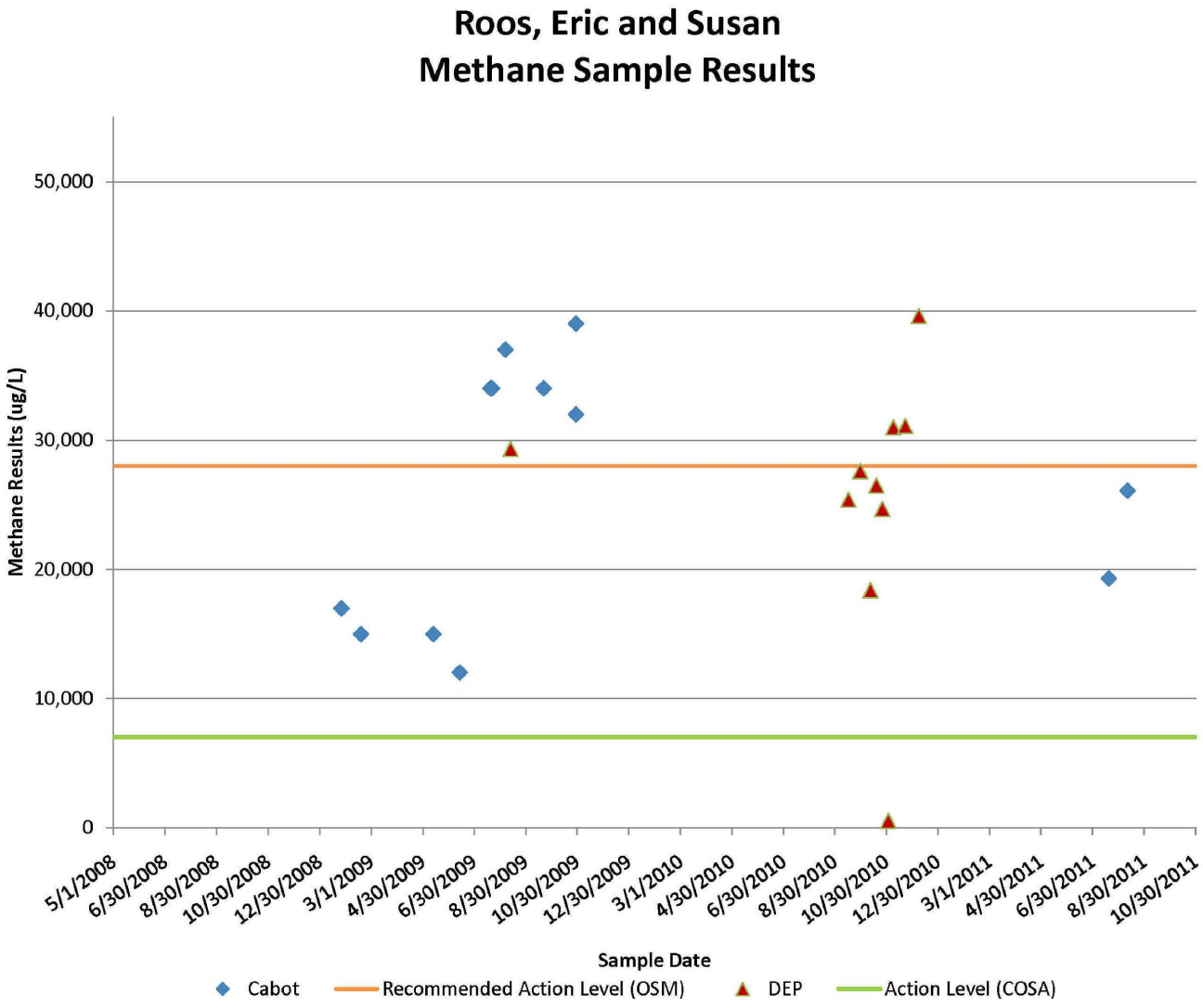
Roos, Eric and Susan – Water Well Summary

Water Well - Owner	Eric B.J. and Susan Roos
Exceed Primary:	None
Exceed Secondary:	Iron Manganese
Dissolved Gas:	Most Recent Result =26.1 mg/L (8/11/2011)
Before Treatment:	N/A
After Treatment:	N/A
Gas Wells ≤ 1000':	Ratzel 1H Ratzel 2H Ratzel 3V
Gas Wells 1000' - 2500':	None
Plan Forward:	Offer treatment system. Continue to monitor as per CO&SA
Comments:	Microbial Gas. Receiving bottled and bulk water. Refused treatment system.

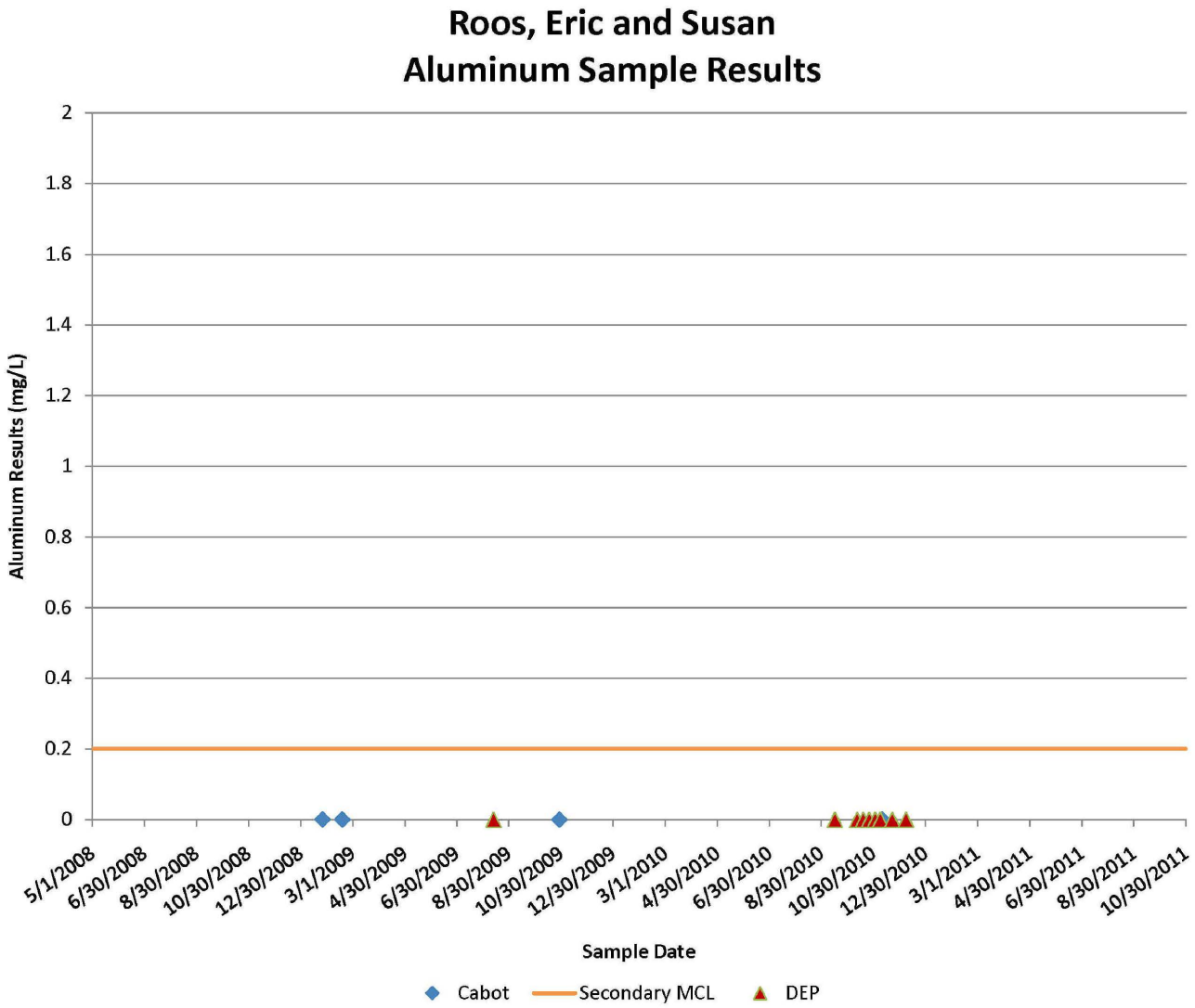
Roos – CGI and Dissolved Methane Graphs



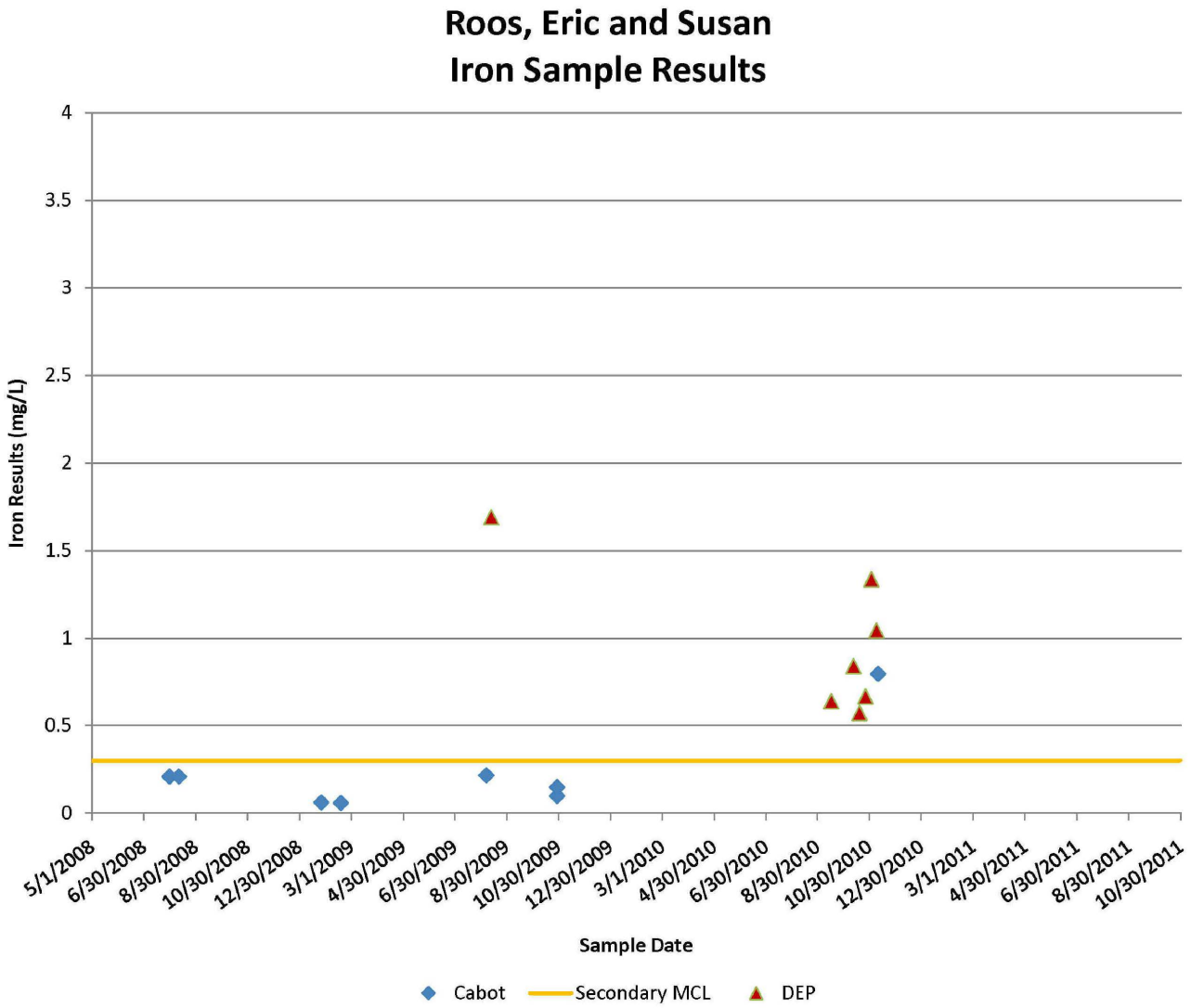
Roos, Eric and Susan – CH4 Results



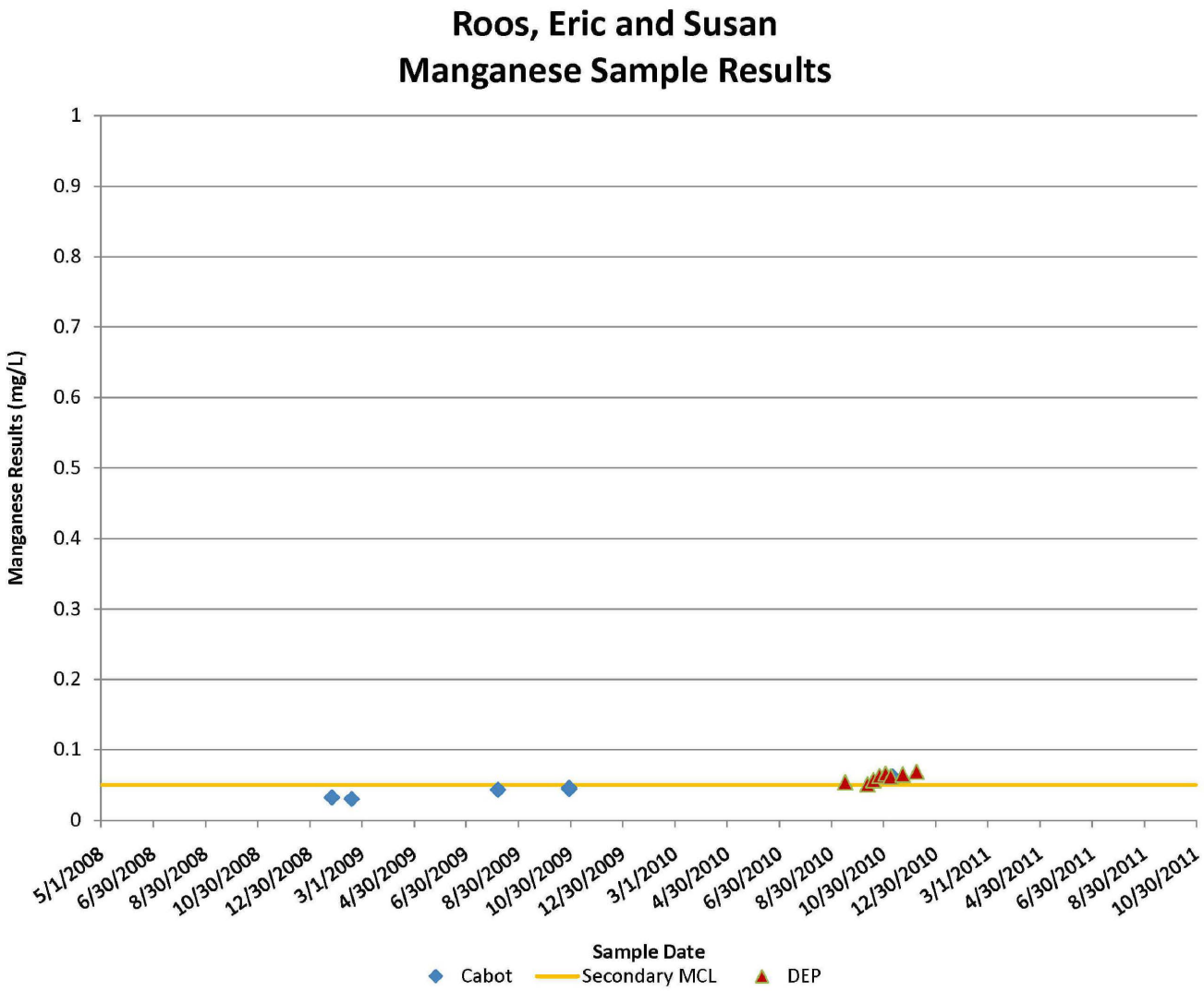
Roos, Eric and Susan – Al Results



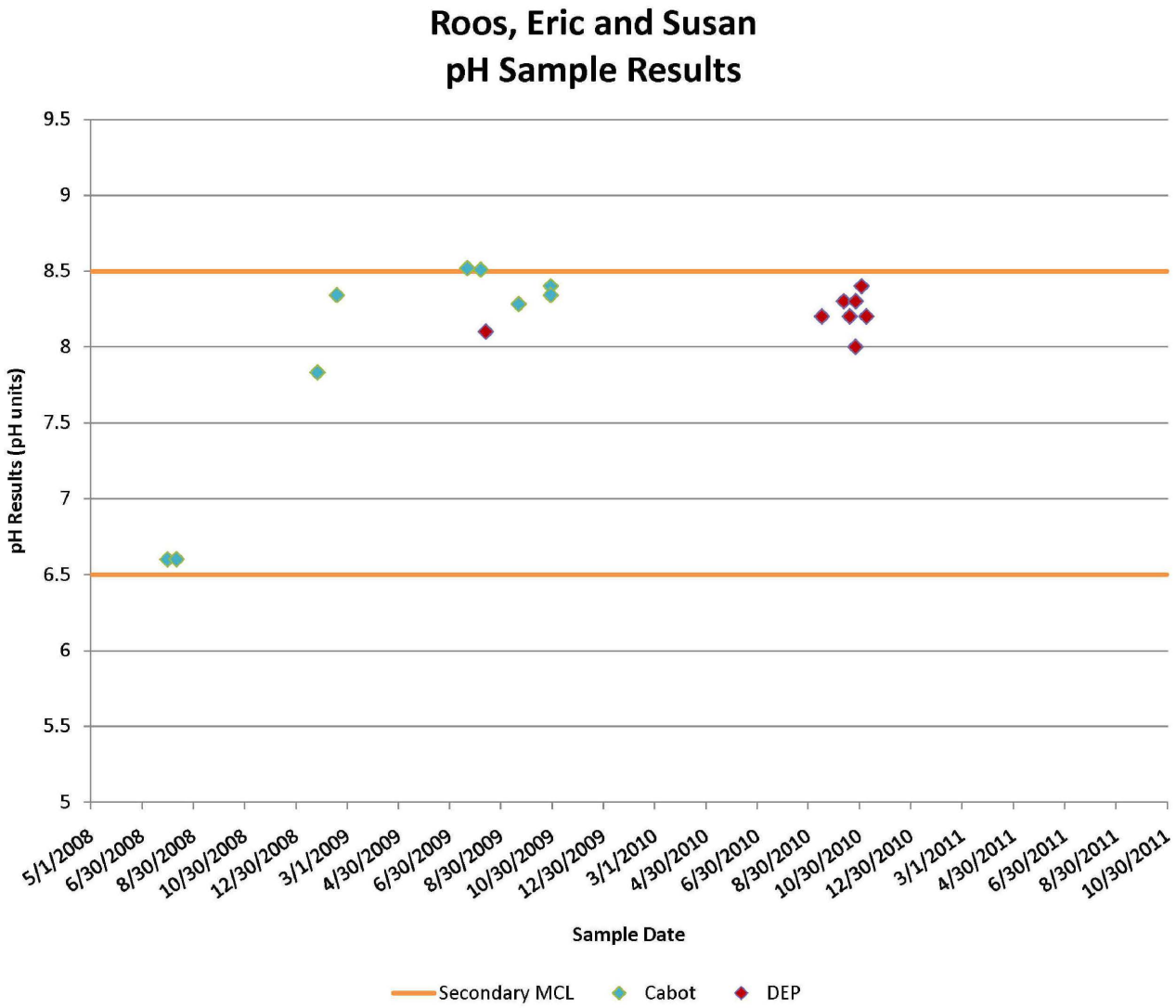
Roos, Eric and Susan – Fe Results



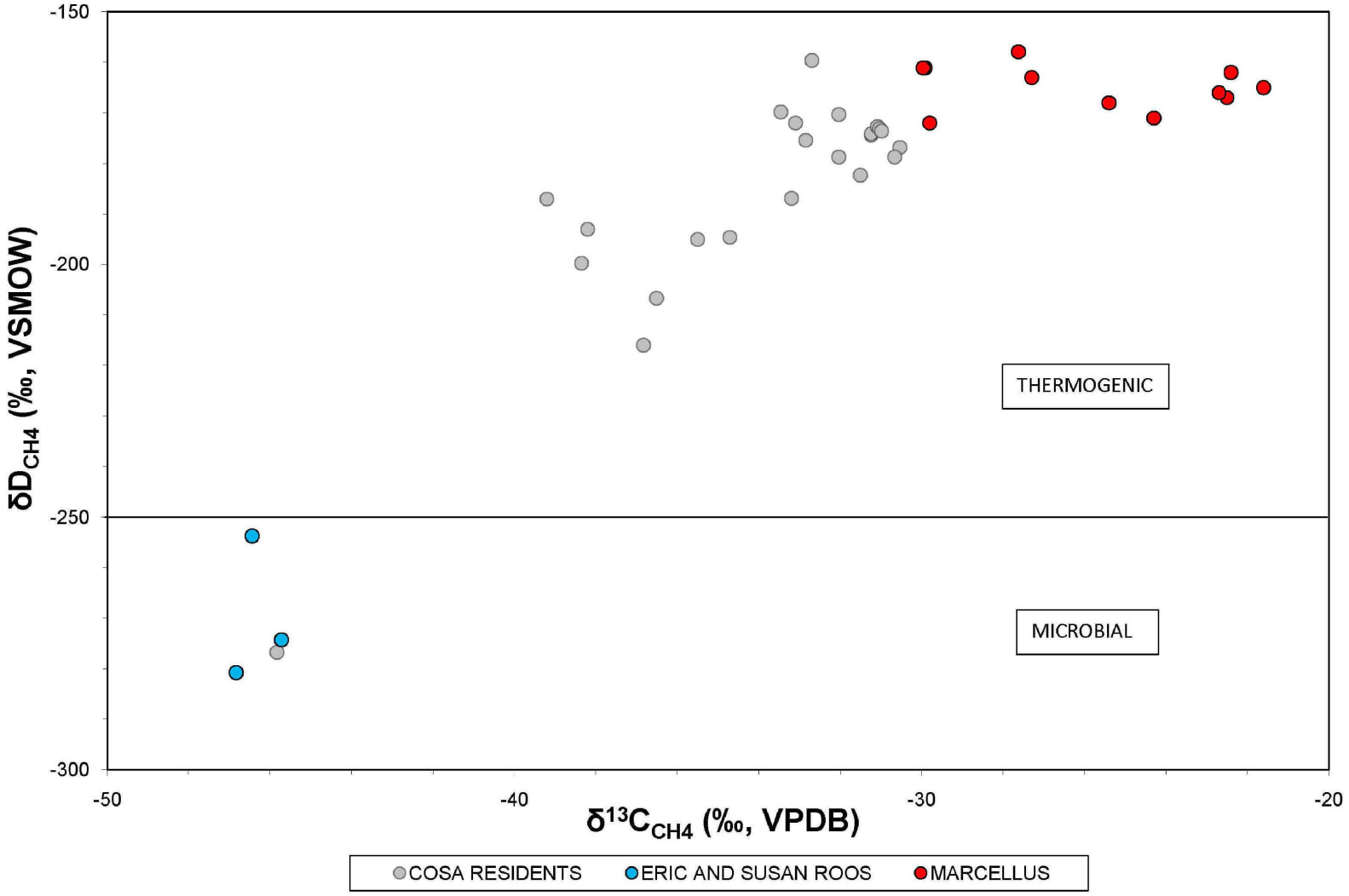
Roos, Eric and Susan – Mn Results



Roos, Eric and Susan – pH Results



Roos, Eric and Susan – Isotopes



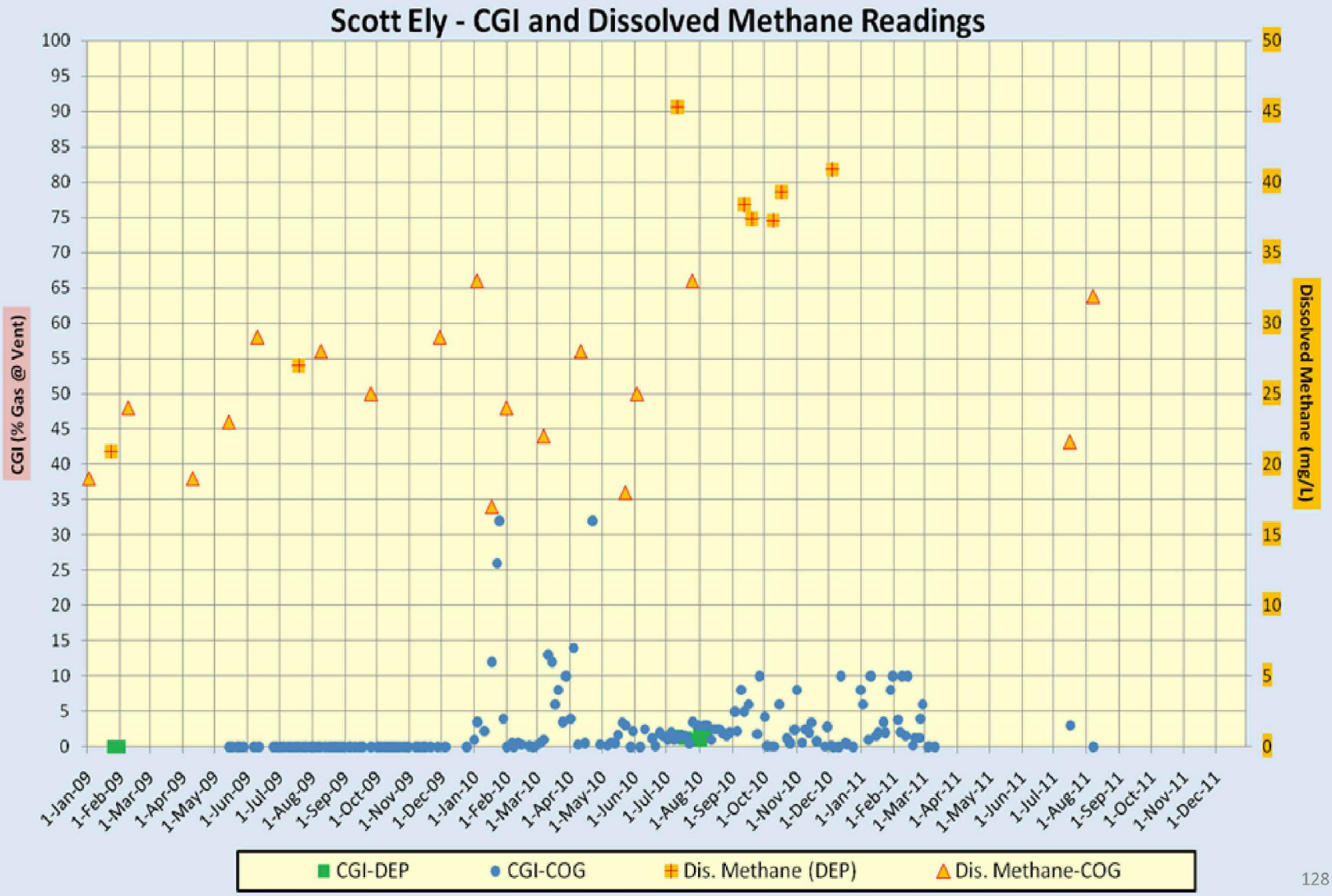
Group C (2 water wells)

Refused treatment system

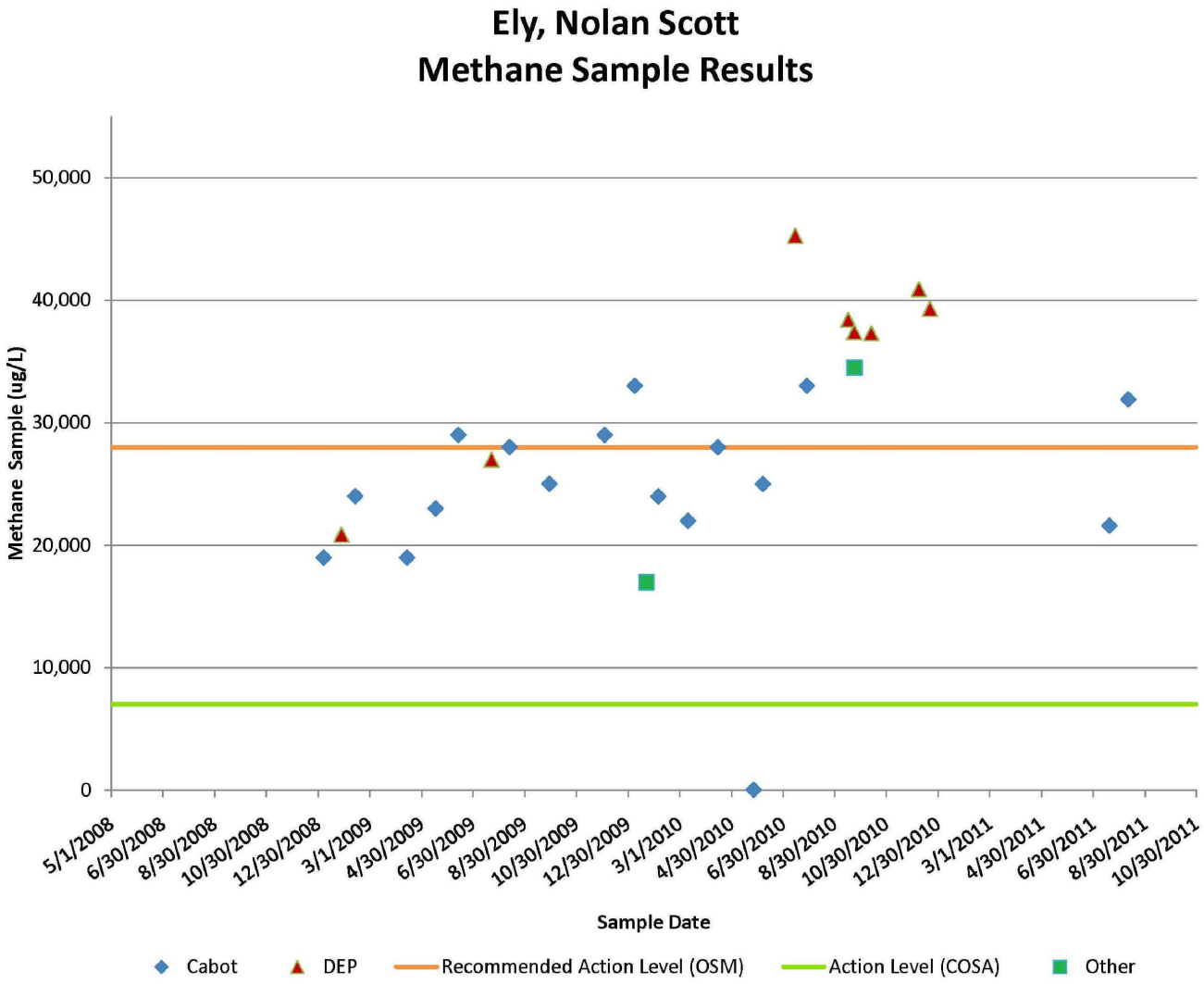
Ely, Scott and Monica – Water Well Summary

Water Well - Owner	Scott and Monica Ely
Exceed Primary:	None
Exceed Secondary:	pH Aluminum Iron
Dissolved Gas:	Most Recent Result = 31.9 mg/L (8/11/2011)
Before Treatment:	N/A
After Treatment:	N/A
Gas Wells ≤ 1000':	Gesford 9V - P&A Gesford 3 - P&A
Gas Wells 1000' - 2500':	Costello 1V Ely 1H Ely 2V Ely 5H Ely 7H
Plan Forward:	Offer treatment system. Continue to monitor as per CO&SA
Comments:	Receiving bottled and bulk water. Refused treatment system.

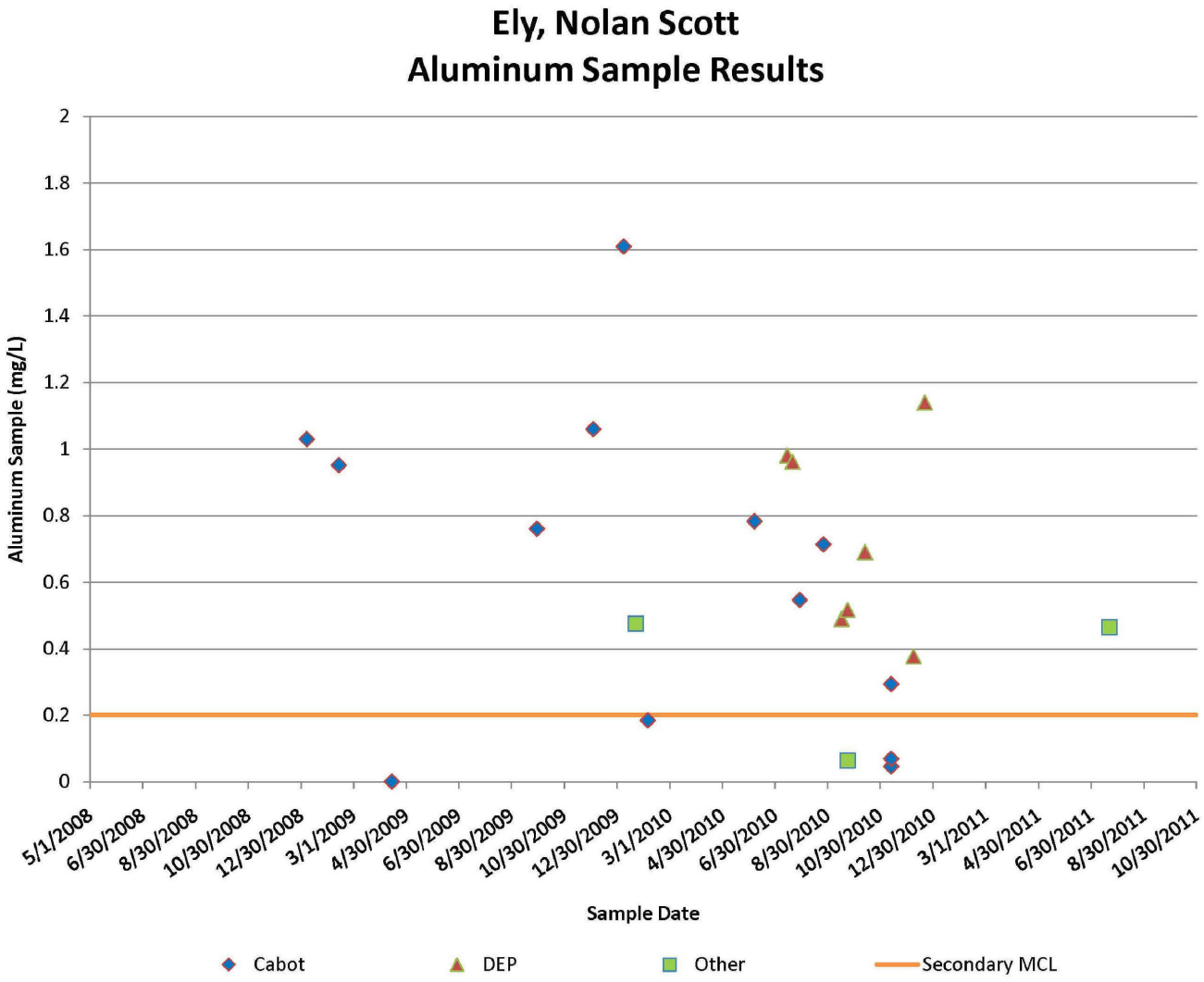
Ely, Nolan Scott – CGI and Dissolved Methane Graphs



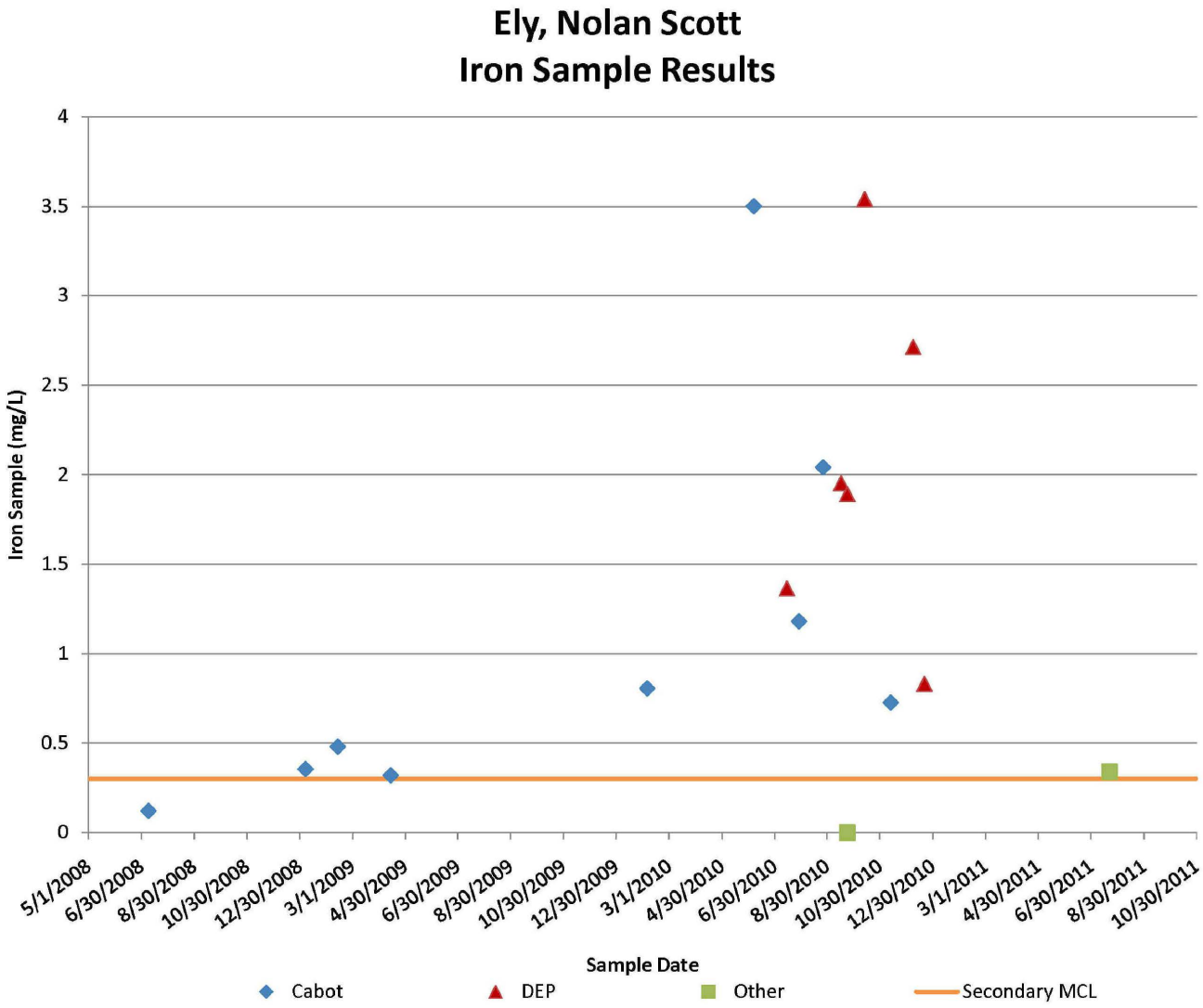
Ely, Nolan Scott – CH4 results



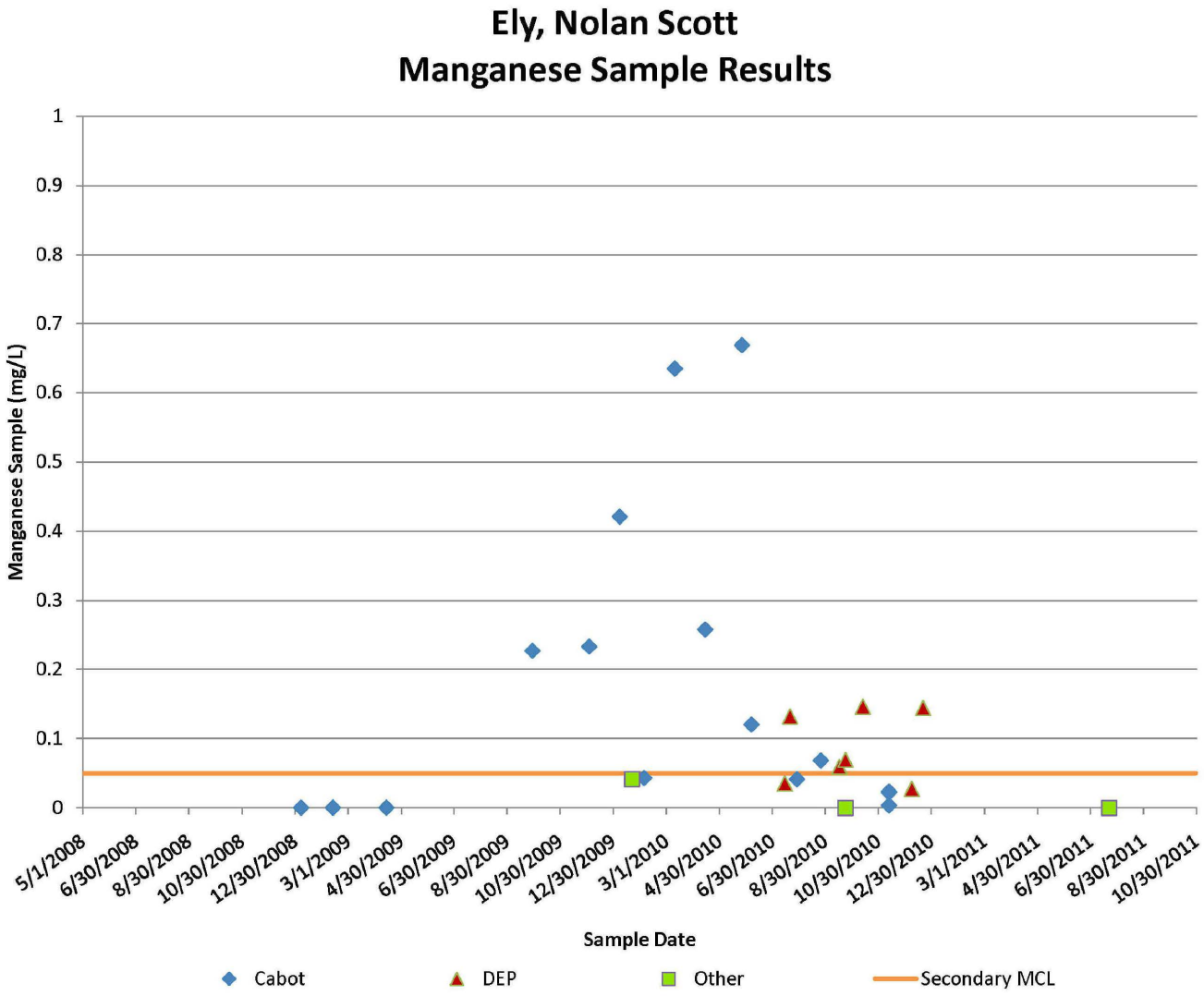
Ely, Nolan Scott – Al results



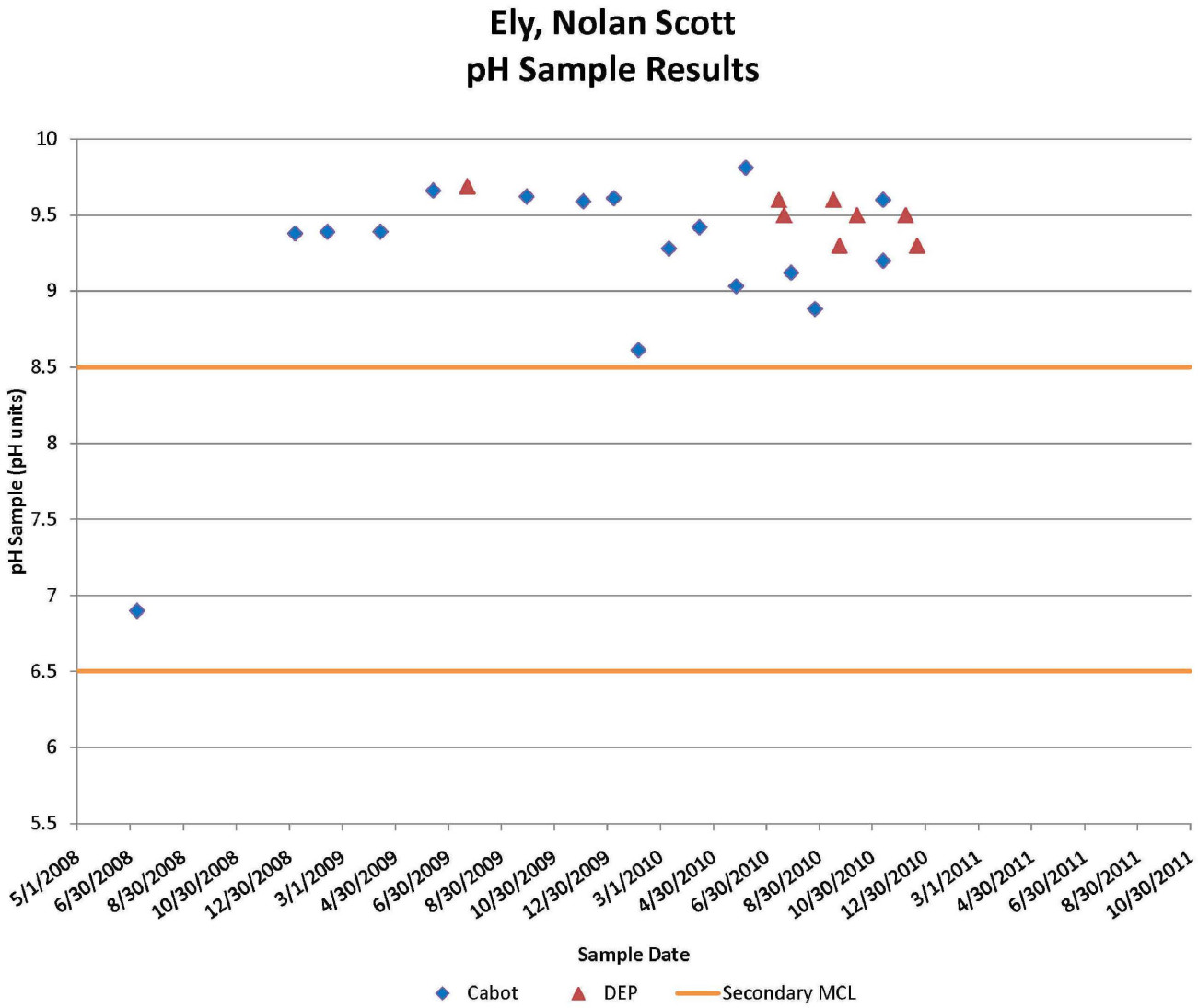
Ely, Nolan Scott – Fe results



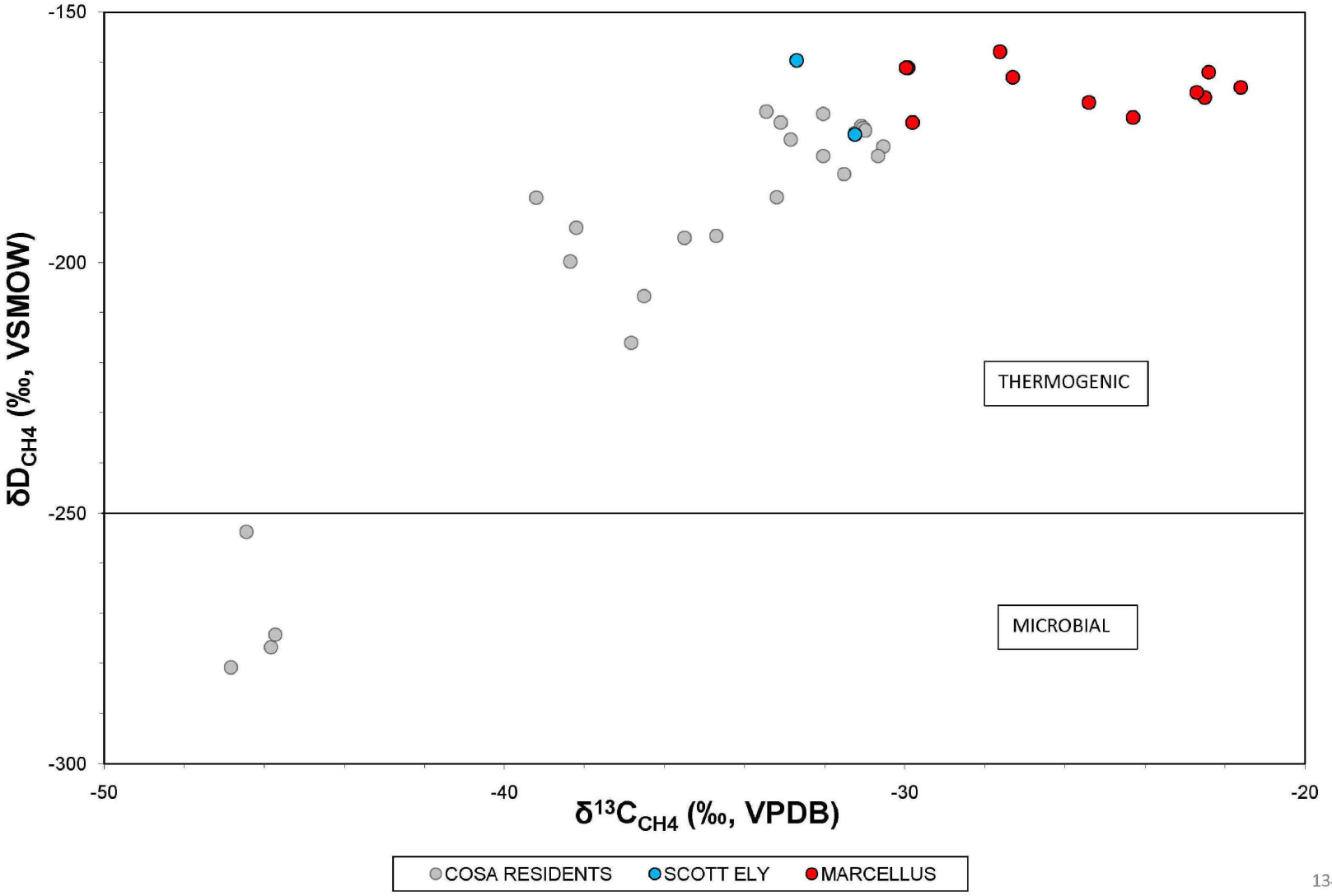
Ely, Nolan Scott – Mn results



Ely, Nolan Scott – pH results



Ely, Nolan Scott – Isotopes



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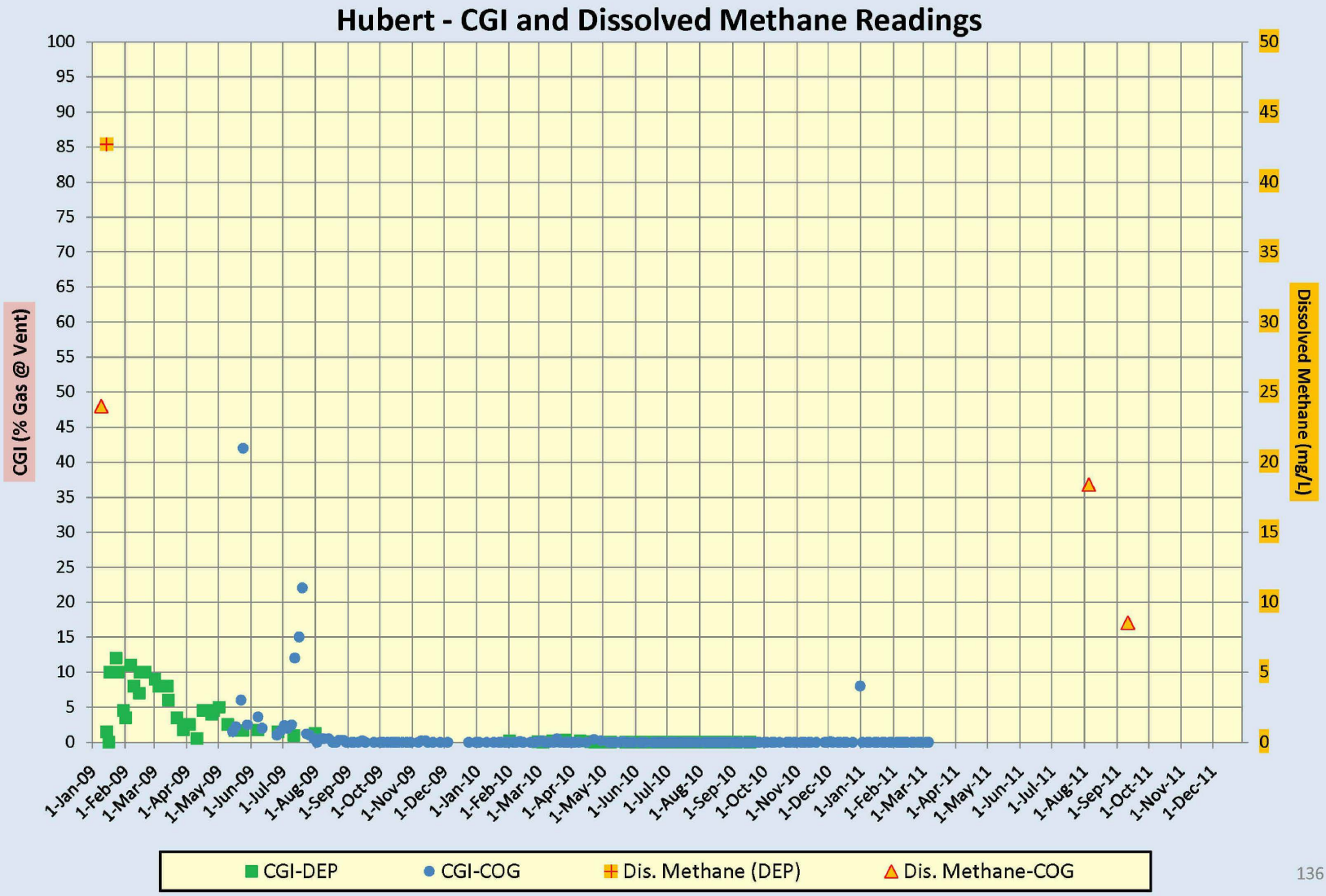
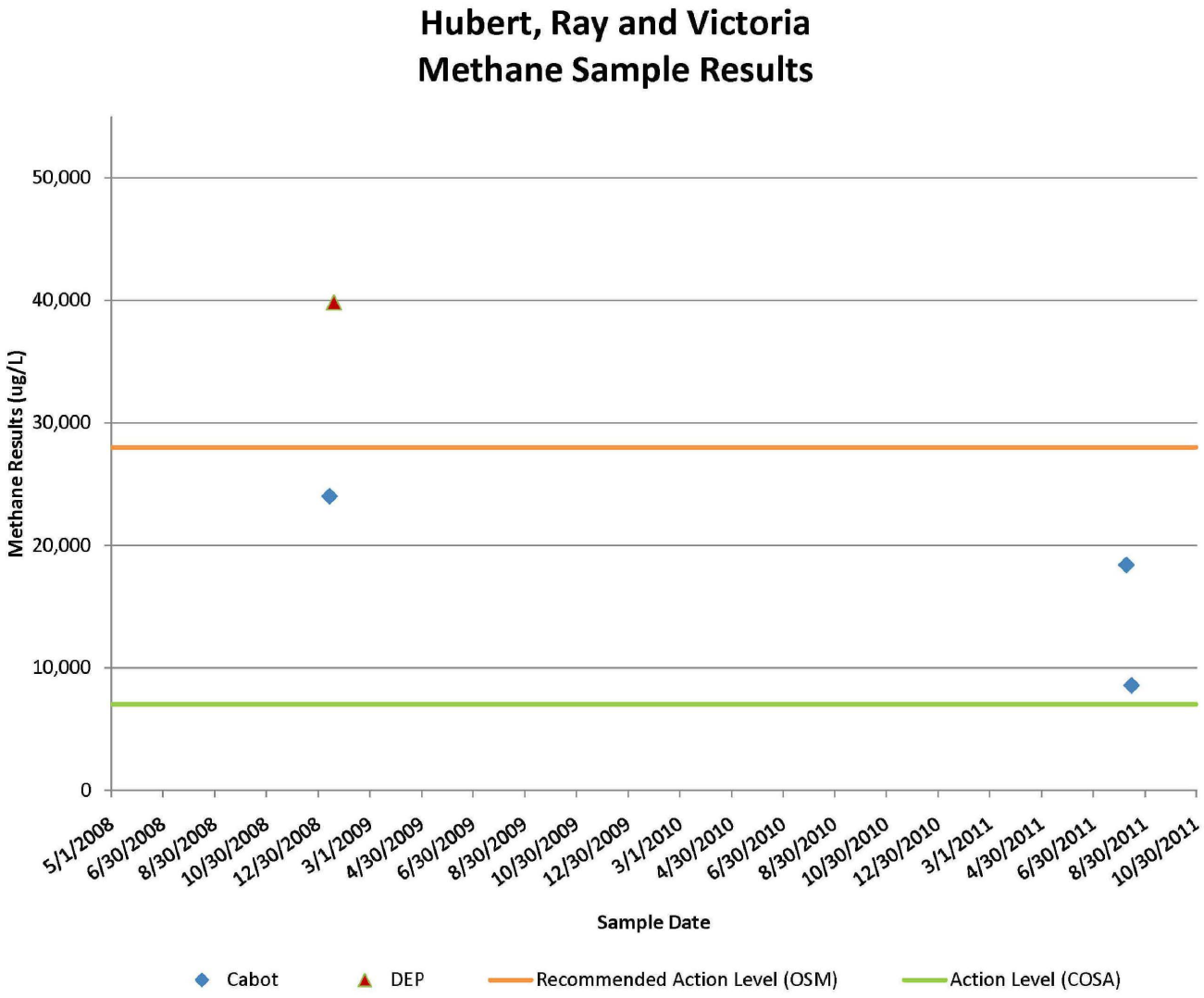
Hubert, Ray and Victoria – Water Well Summary

Water Well - Owner	Ray and Victoria Hubert
Exceed Primary:	None
Exceed Secondary:	Iron
Dissolved Gas:	Most Recent Result = 8.54 mg/L (9/15/2011)
Before Treatment:	N/A
After Treatment:	N/A
Gas Wells ≤ 1000':	Gesford 3 - P&A Gesford 9V - P&A
Gas Wells 1000' - 2500':	Costello 1V, Gesford 2V Costello 2V, Gesford 4H Ely 2V, Gesford 7H Ely 5H, Gesford 8H
Plan Forward:	Offer treatment system. Continue to monitor as per CO&SA.
Comments:	Receiving bottled and bulk water. Refused treatment system.

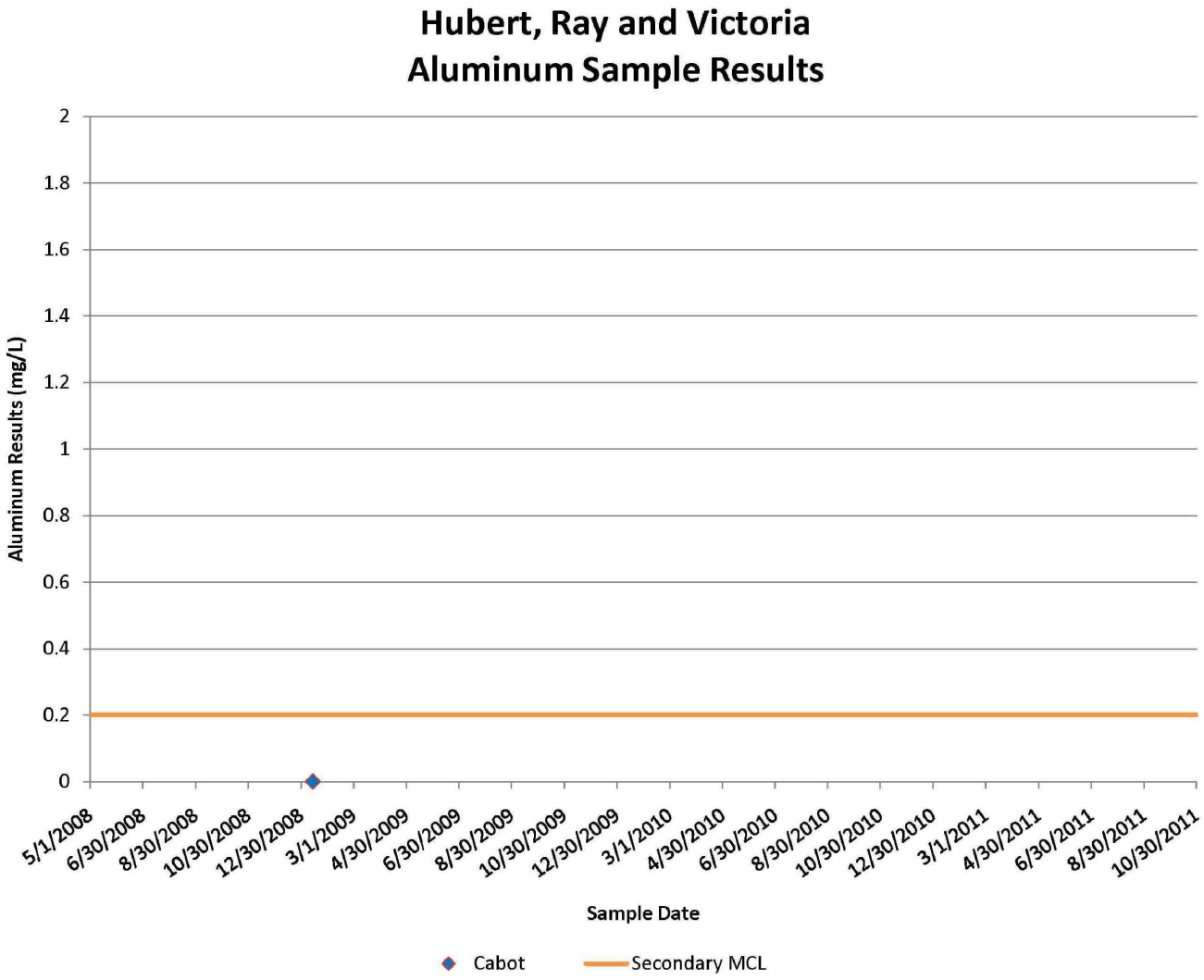
Hubert – CGI and Dissolved Methane Graphs



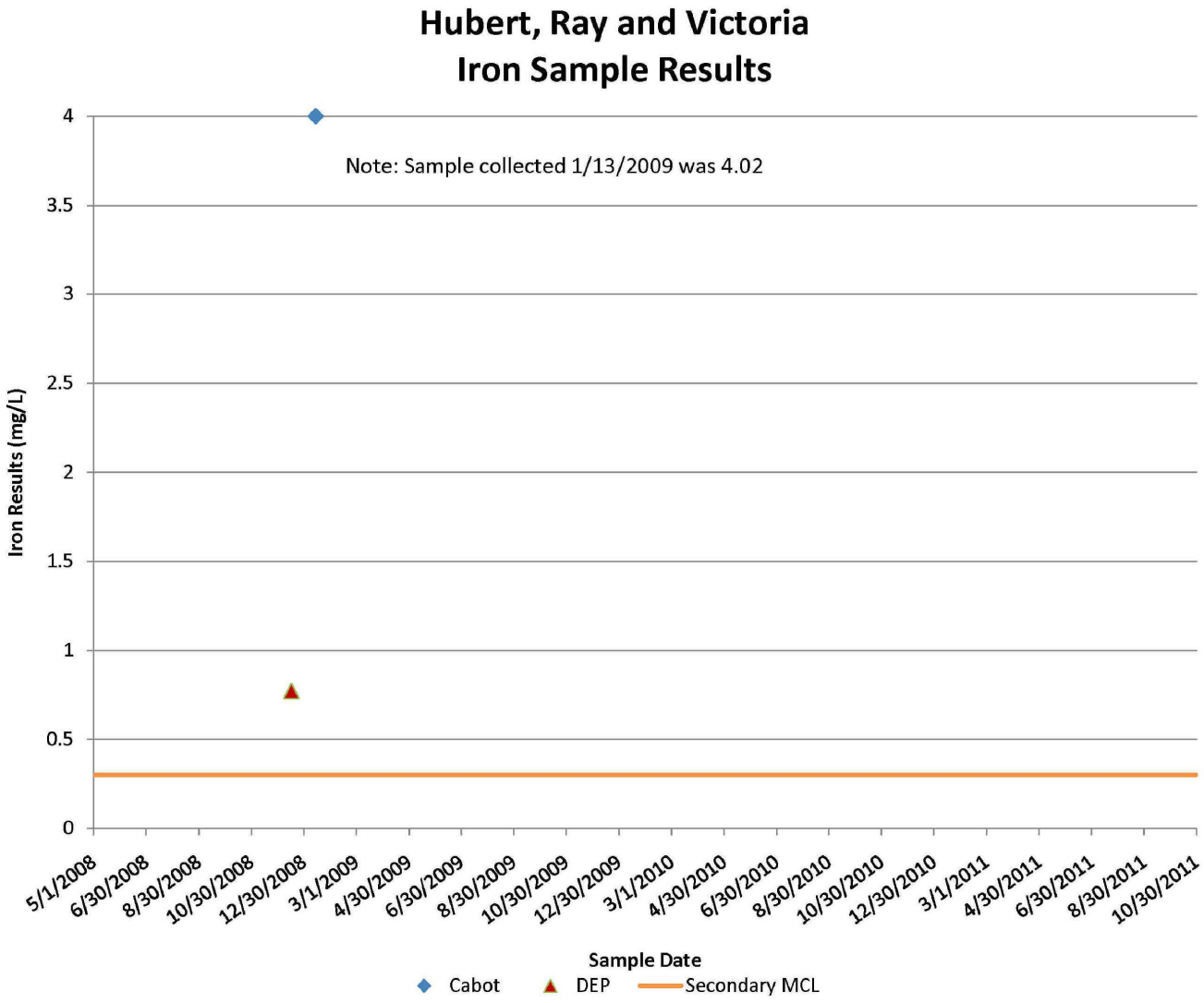
Hubert, Ray and Victoria – CH4 results



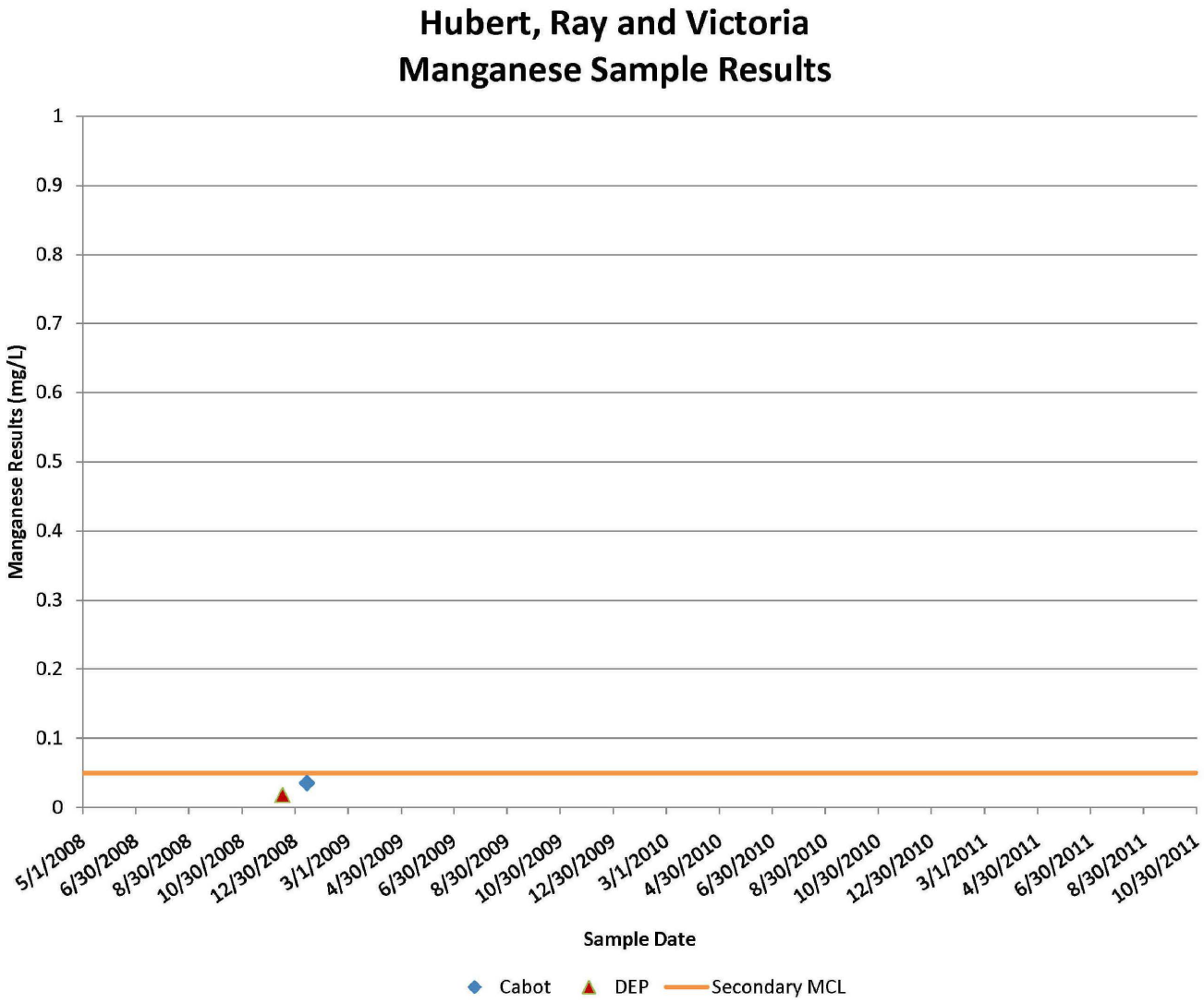
Hubert, Ray and Victoria – Al results



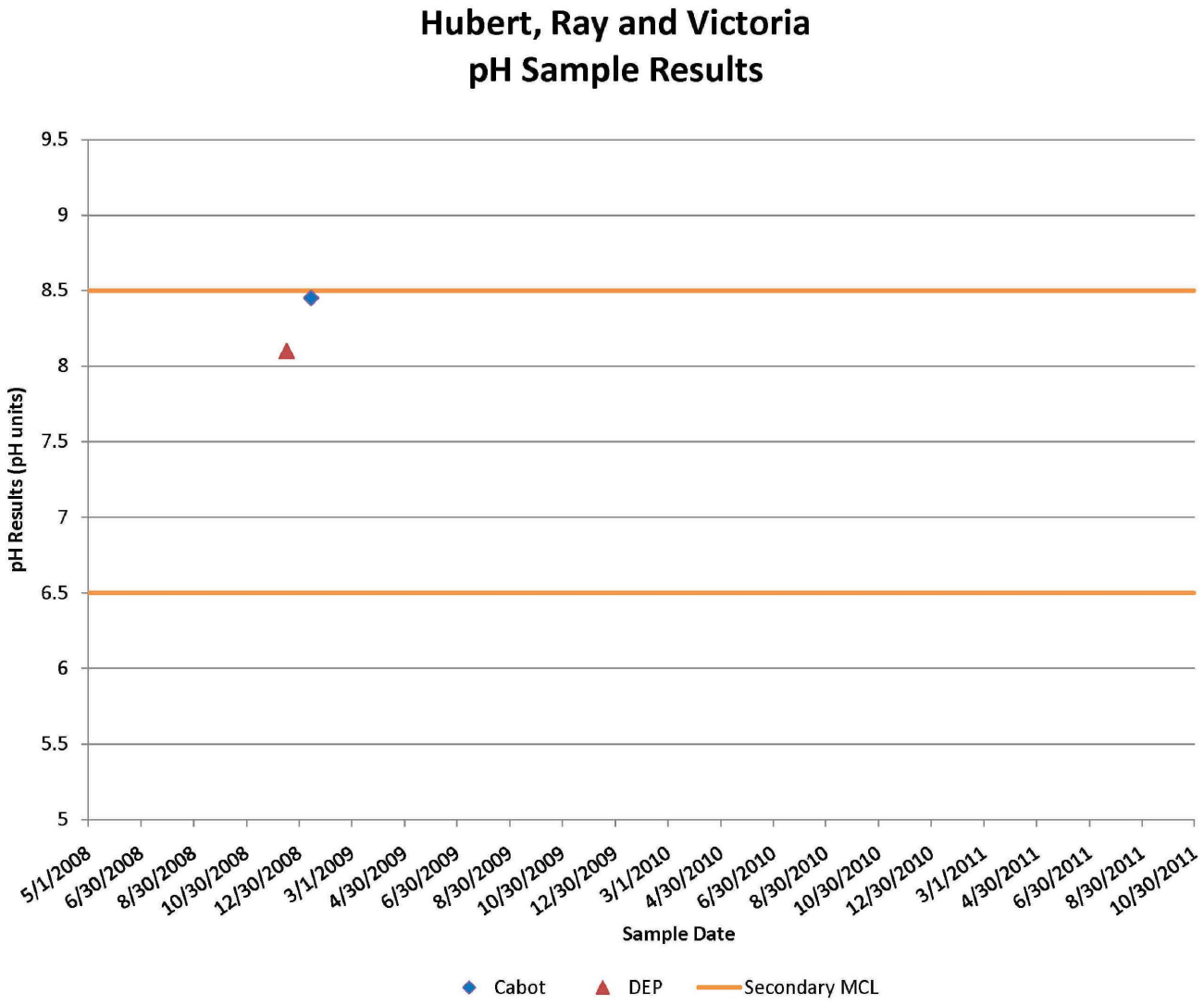
Hubert, Ray and Victoria – Fe results



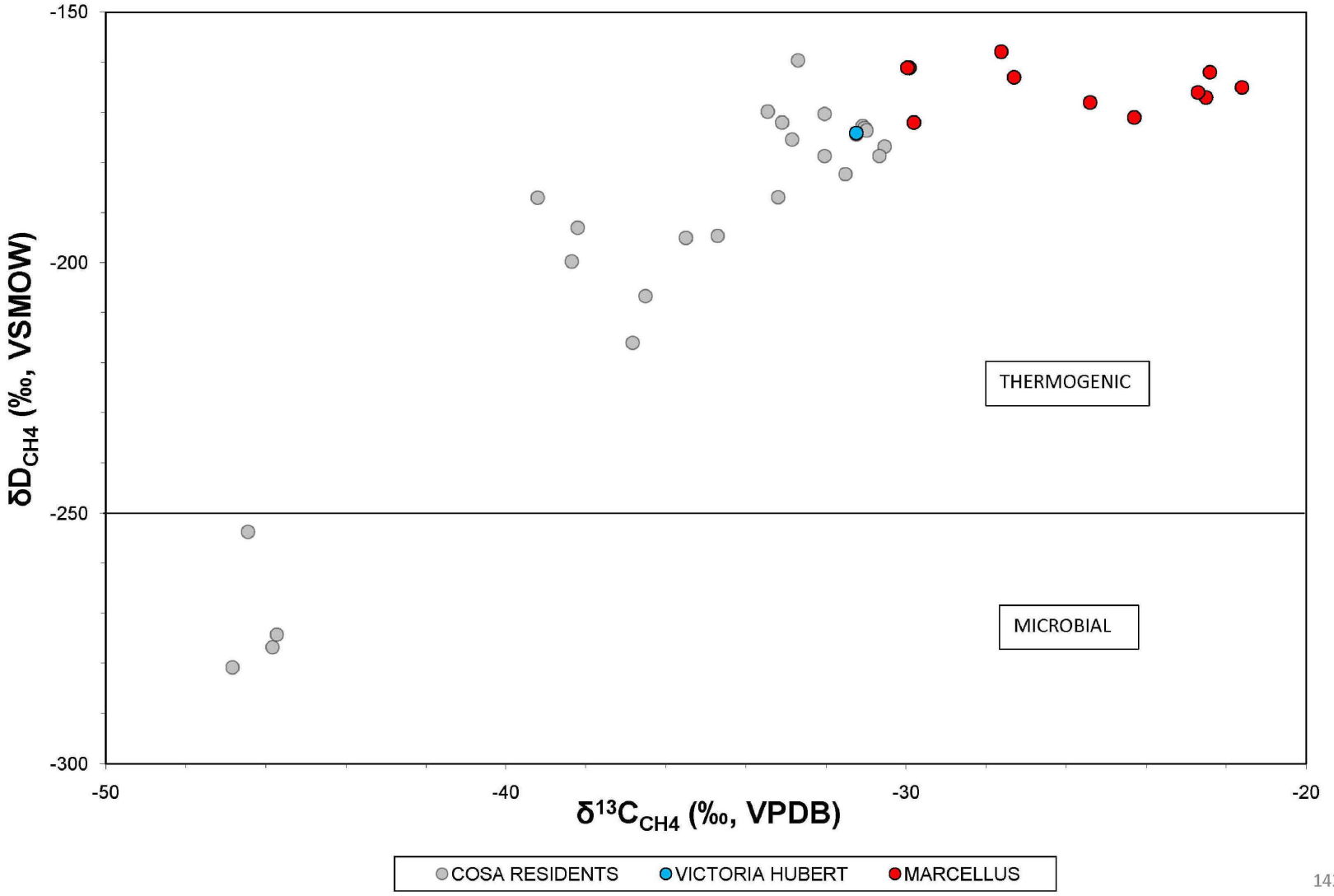
Hubert, Ray and Victoria – Mn results



Hubert, Ray and Victoria – pH results



Hubert, Ray and Victoria – Isotopes



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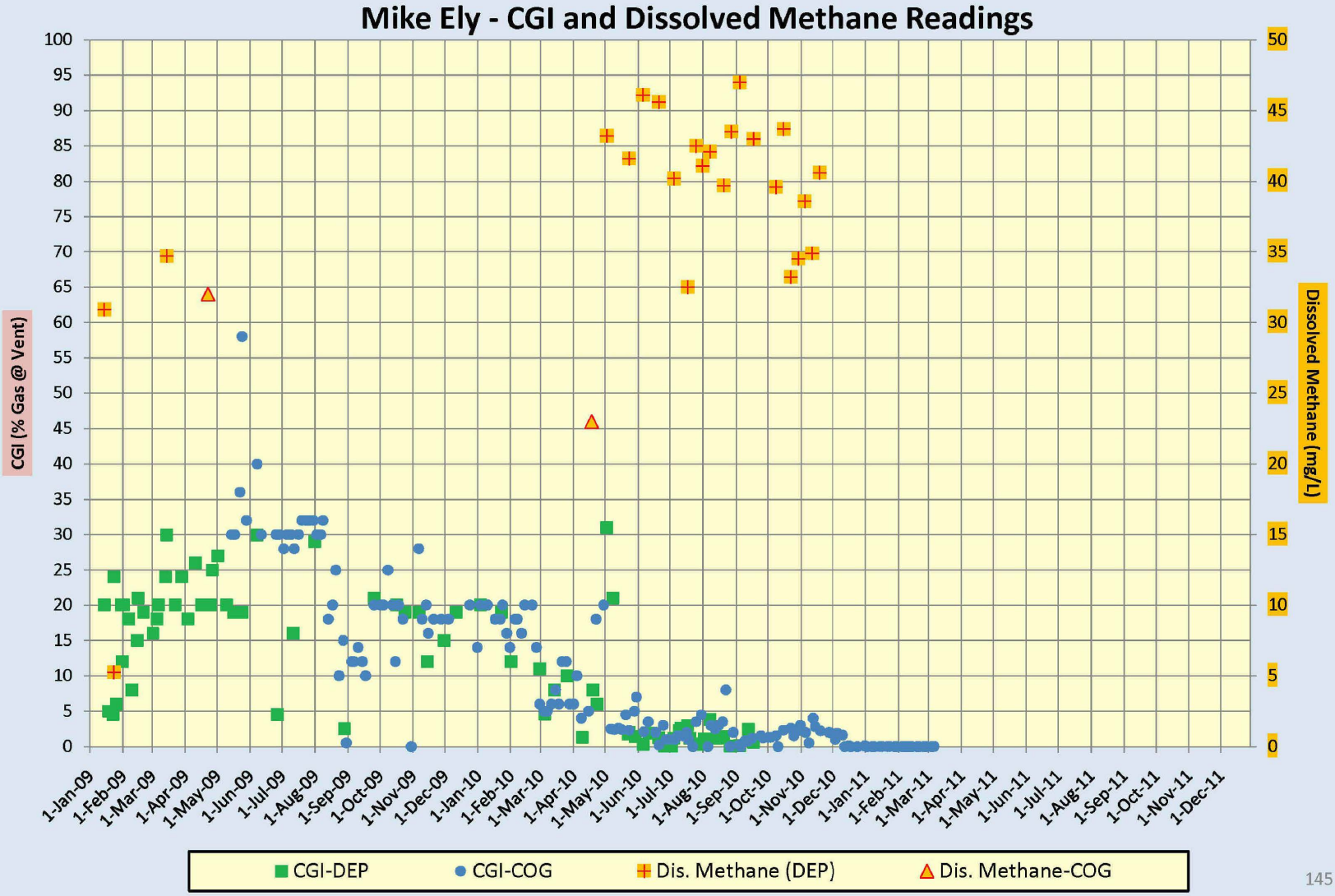
Group D (3 water wells)

Residents refused water sampling for all of 2011
Treatment system declined

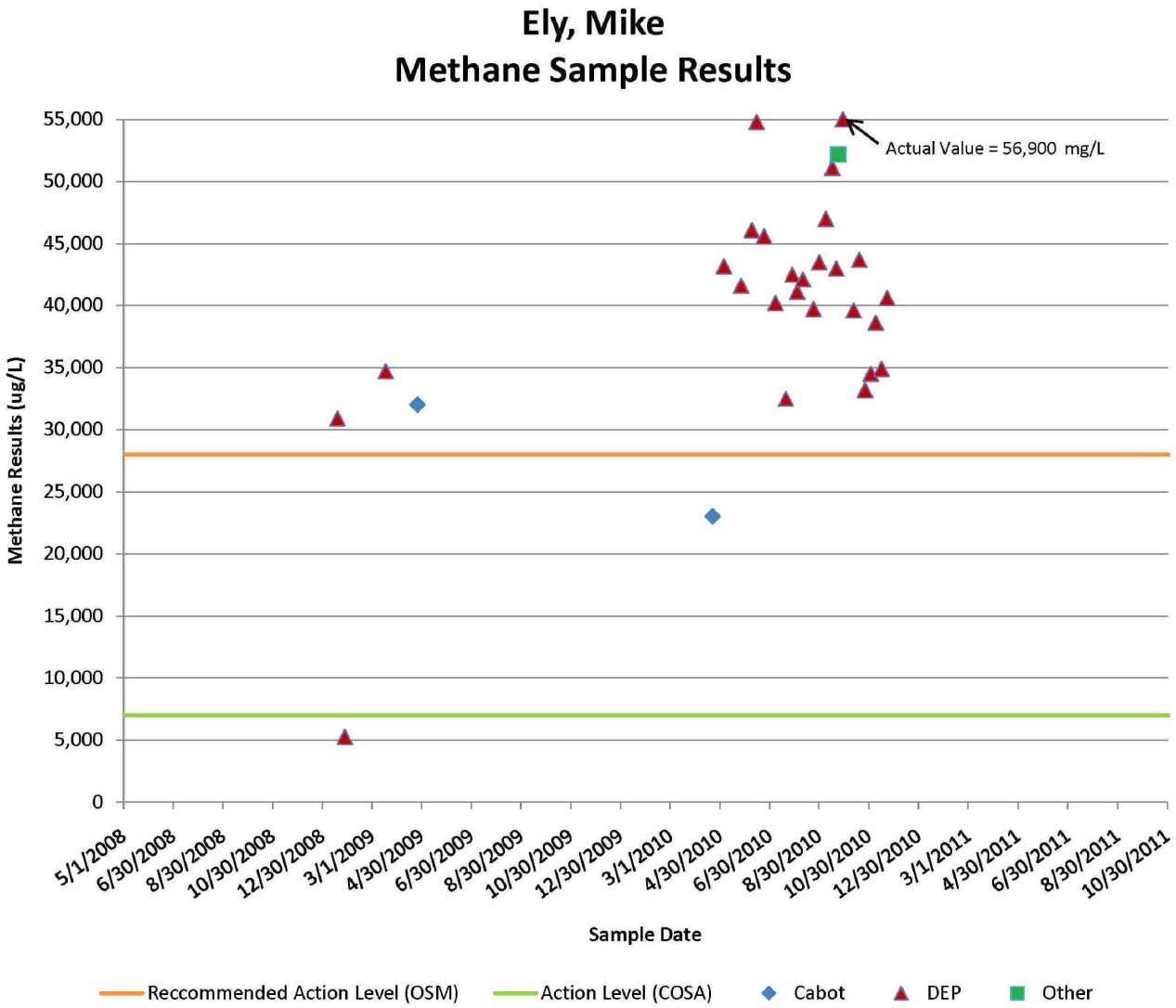
Ely, Mike and Andrea – Water Well Summary

Water Well - Owner	Michael and Andrea Ely
Exceed Primary:	None
Exceed Secondary:	None
Dissolved Gas:	Most Recent Result = 40.6 mg/L (11/22/2010)
Before Treatment:	N/A
After Treatment:	N/A
Gas Wells ≤ 1000':	None
Gas Wells 1000' - 2500':	Ely 2V Costello 2V Gesford 8H Gesford 9V – P&A Gesford 3 - P&A Costello 1V
Plan Forward:	Offer treatment system.
Comments:	Receiving bottled and bulk water. Refusing to allow sampling. Refused treatment system.

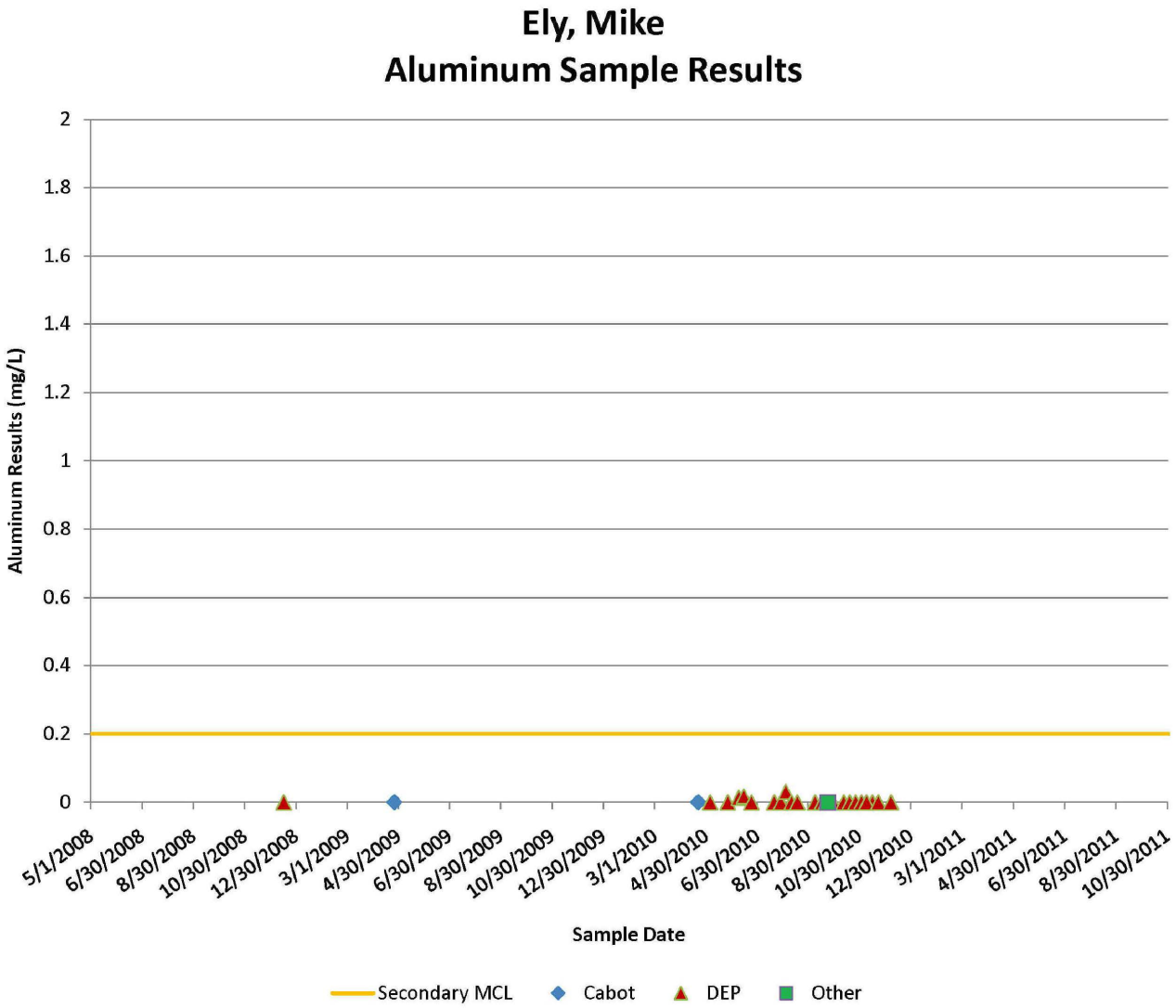
Ely, Mike – CGI and Dissolved Methane Graphs



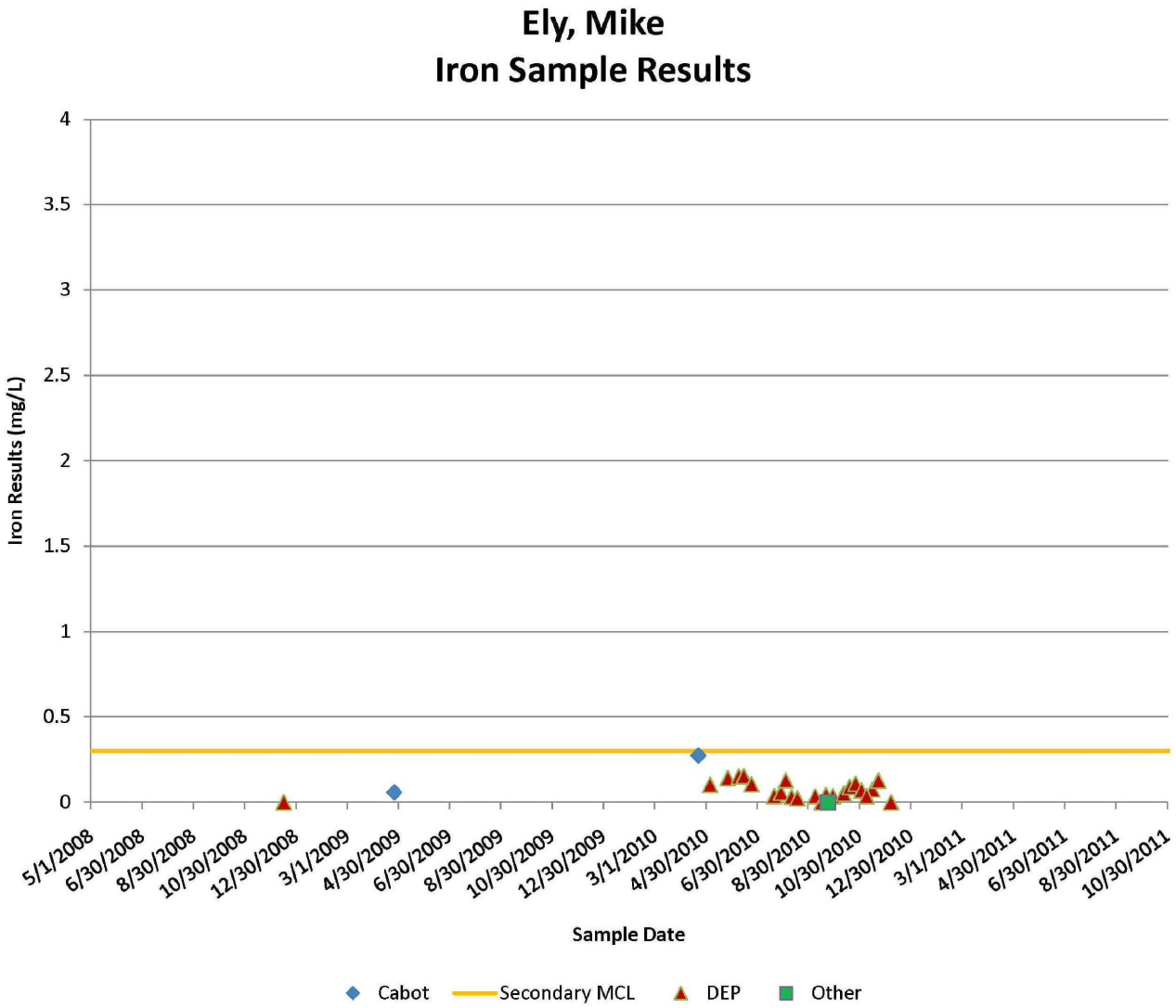
Ely, Mike – CH4 results



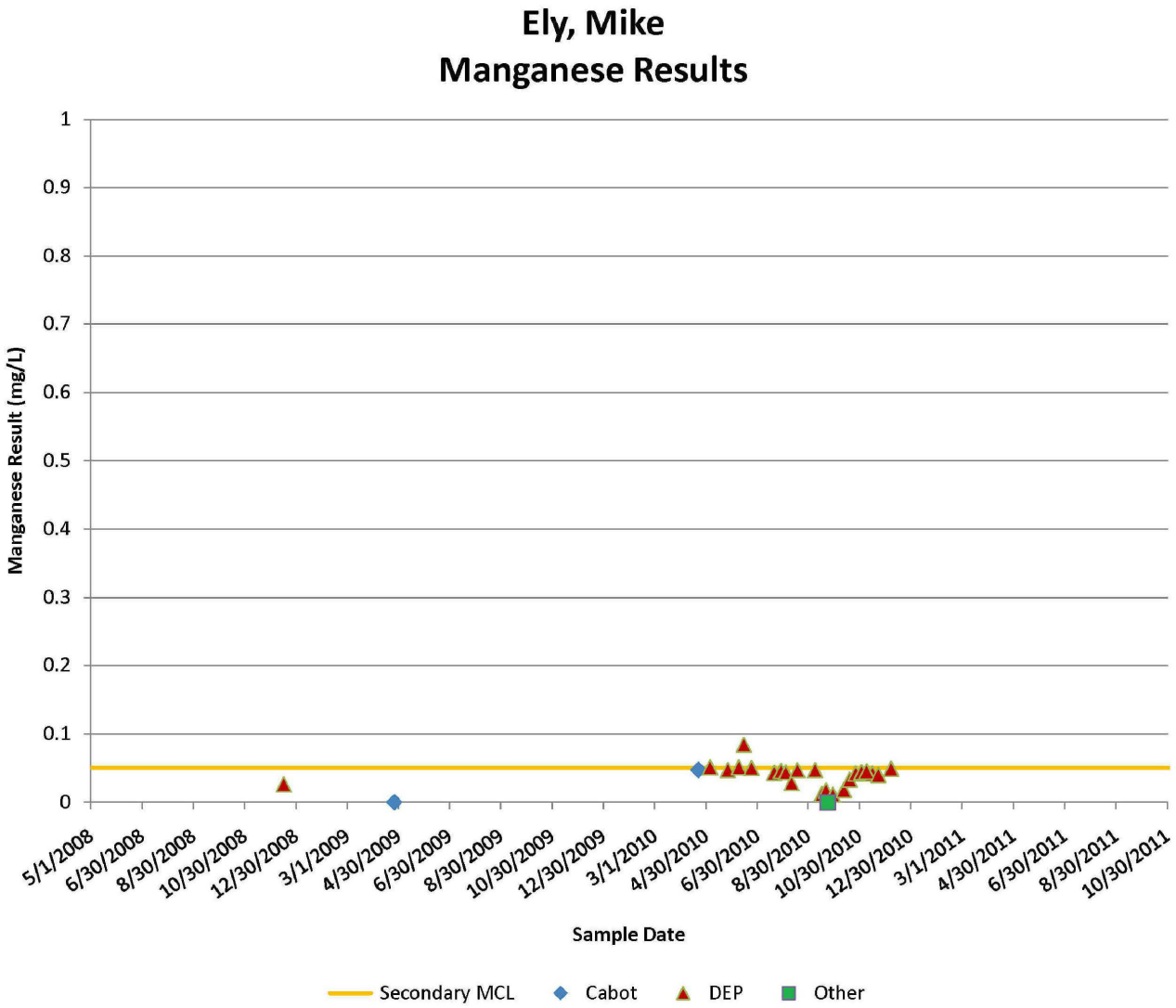
Ely, Mike – Al results



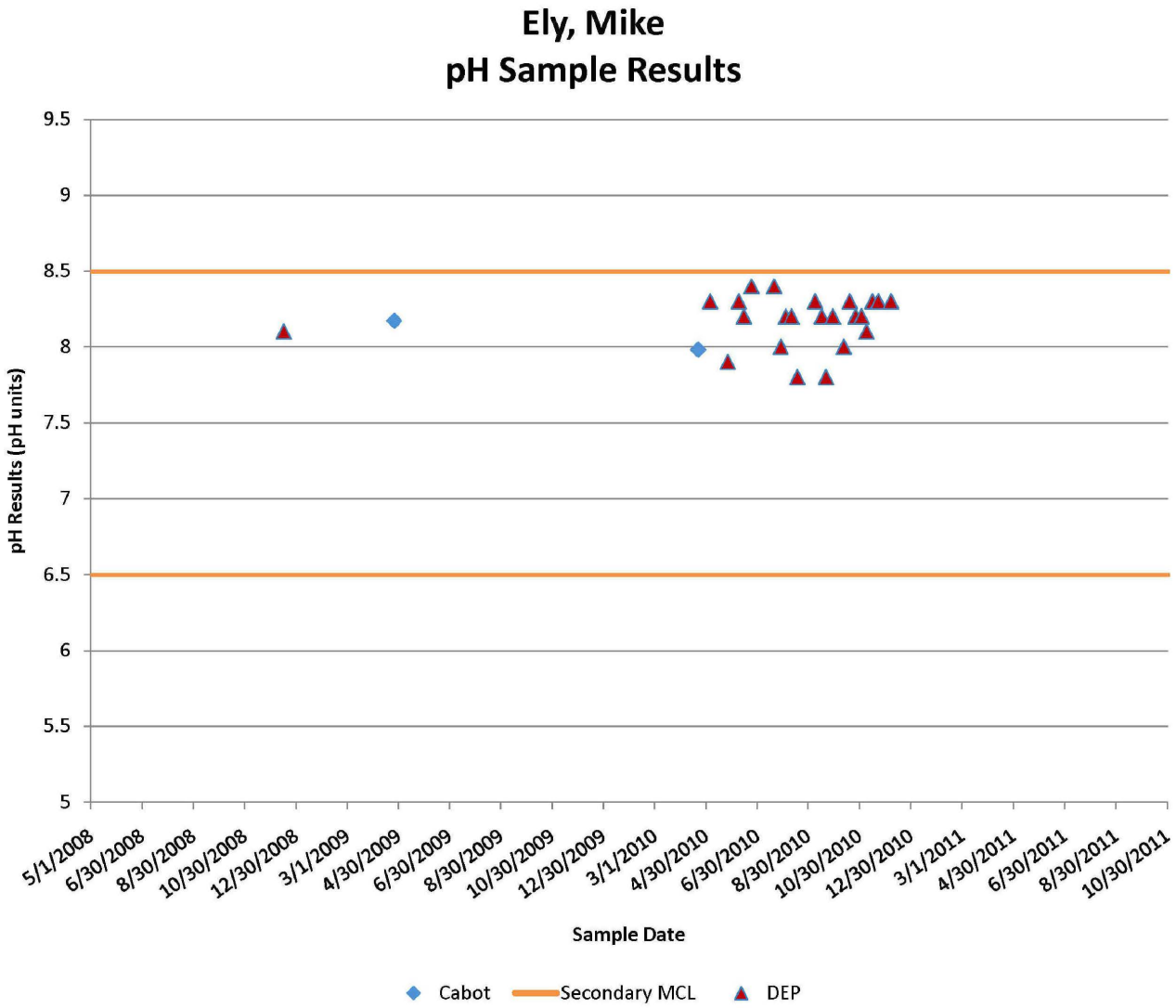
Ely, Mike – Fe results



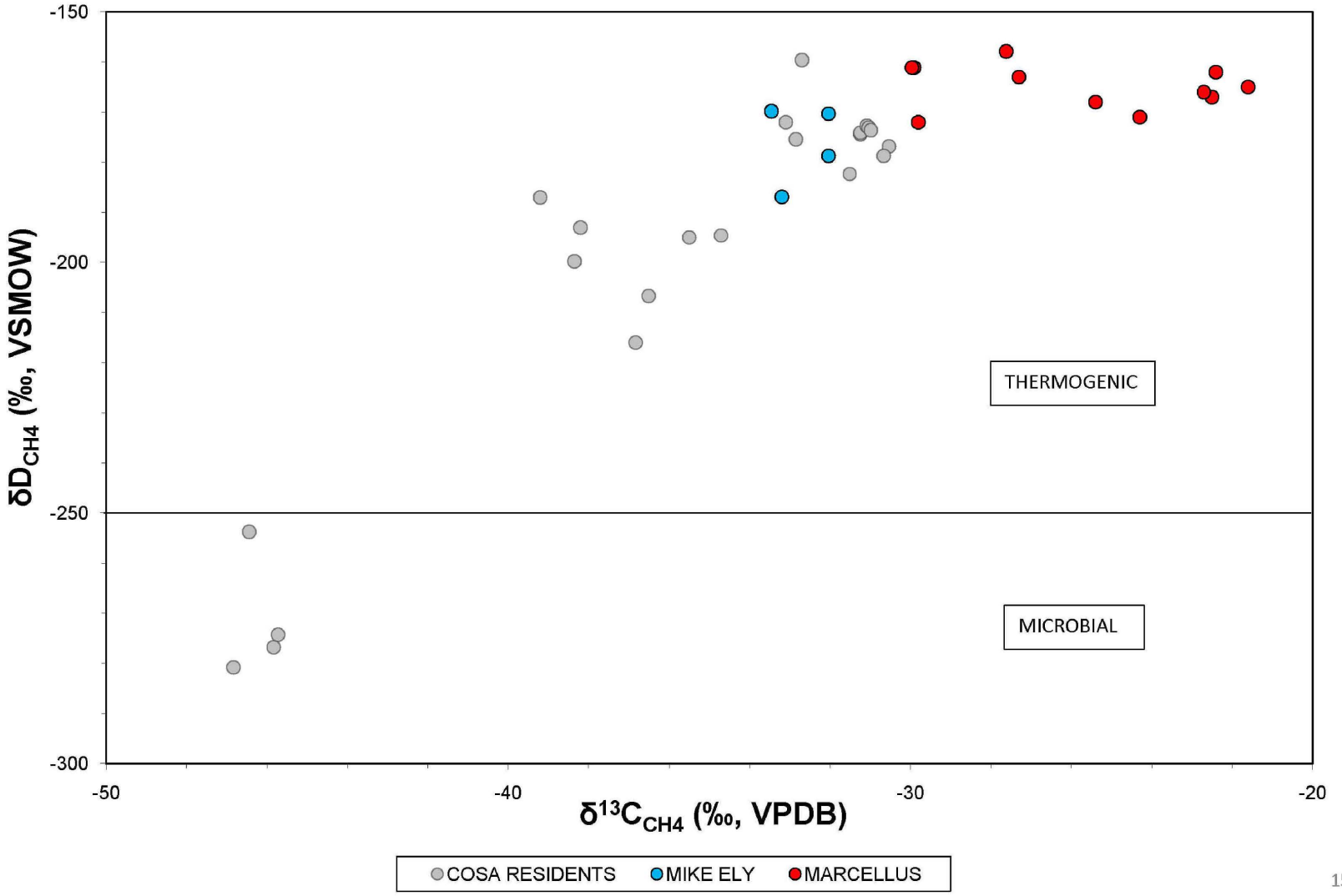
Ely, Mike – Mn results



Ely, Mike – pH results



Ely, Mike - Isotopes



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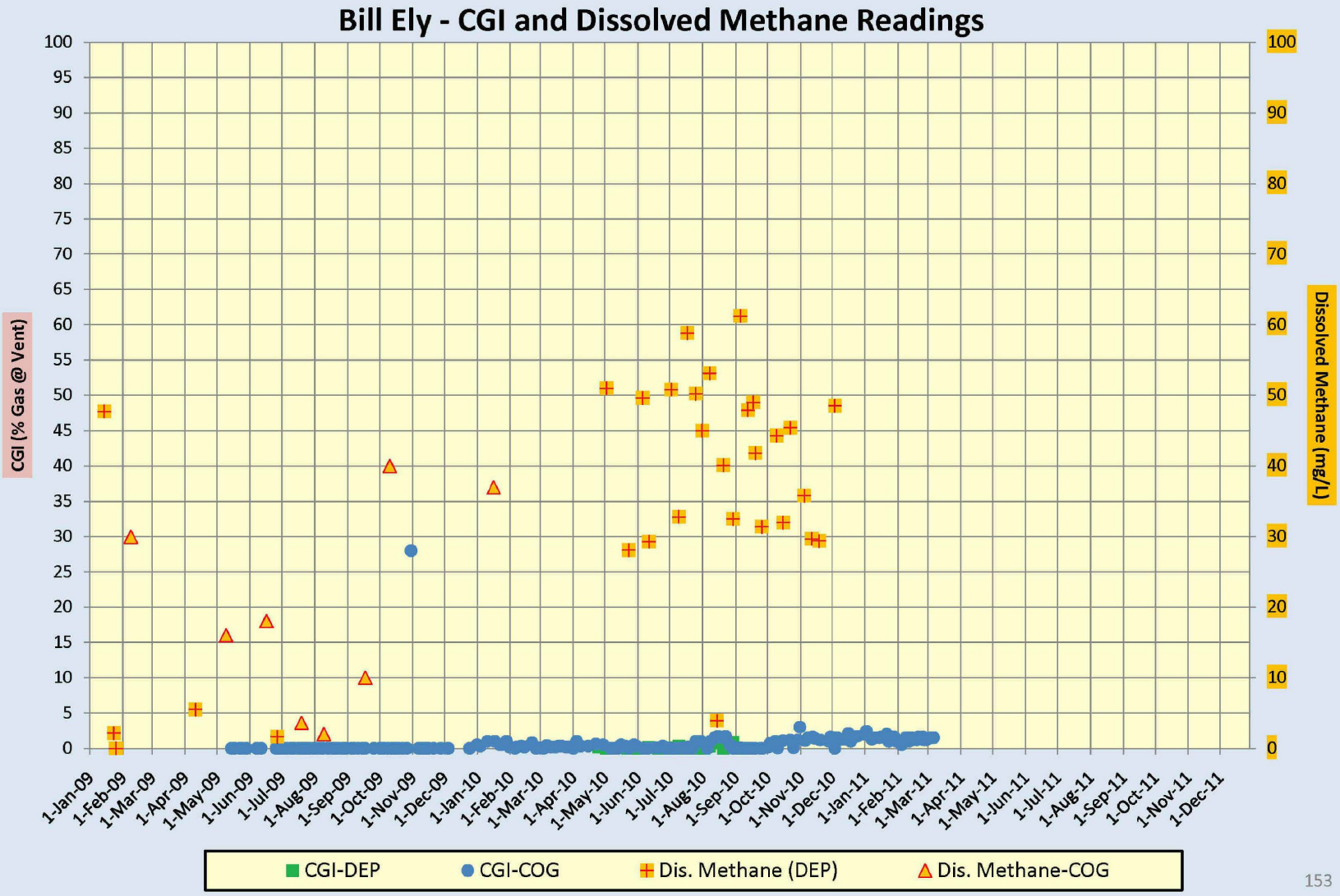
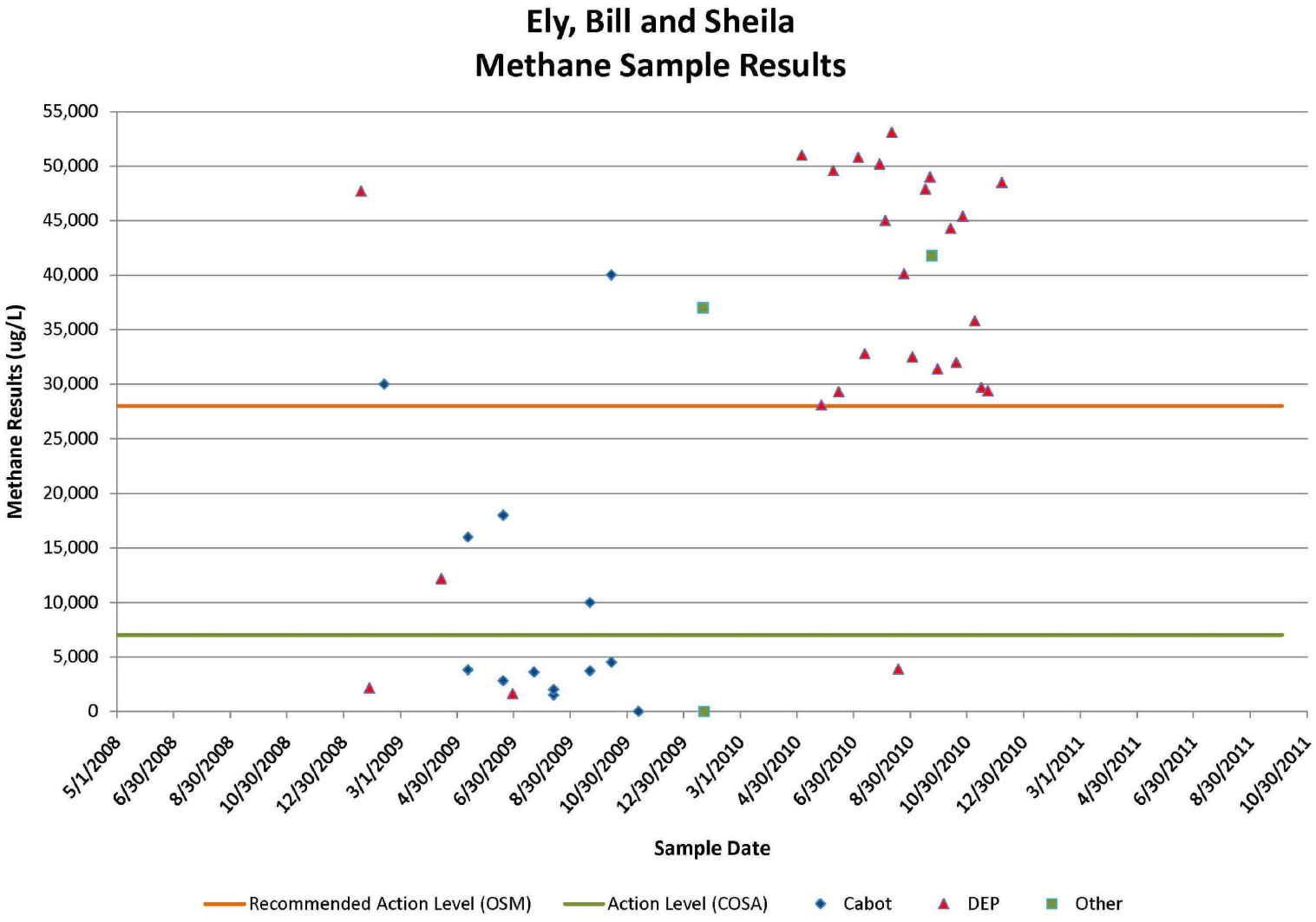
Ely, William and Sheila – Water Well Summary

Water Well - Owner	William T. and Sheila A. Ely
Exceed Primary:	None
Exceed Secondary:	Iron
Dissolved Gas:	Most Recent Result = 48.5 mg/L (12/7/2010)
Before Treatment:	N/A
After Treatment:	N/A
Gas Wells ≤ 1000':	Costello 1V
Gas Wells 1000' - 2500':	Costello 2V Ely 2V Gesford 3 - P&A Gesford 8H Gesford 9V - P&A Gesford 4V Lewis 2V
Plan Forward:	Offer treatment system.
Comments:	Receiving bottled and bulk water. Refused treatment system. Refusing to allow sampling.

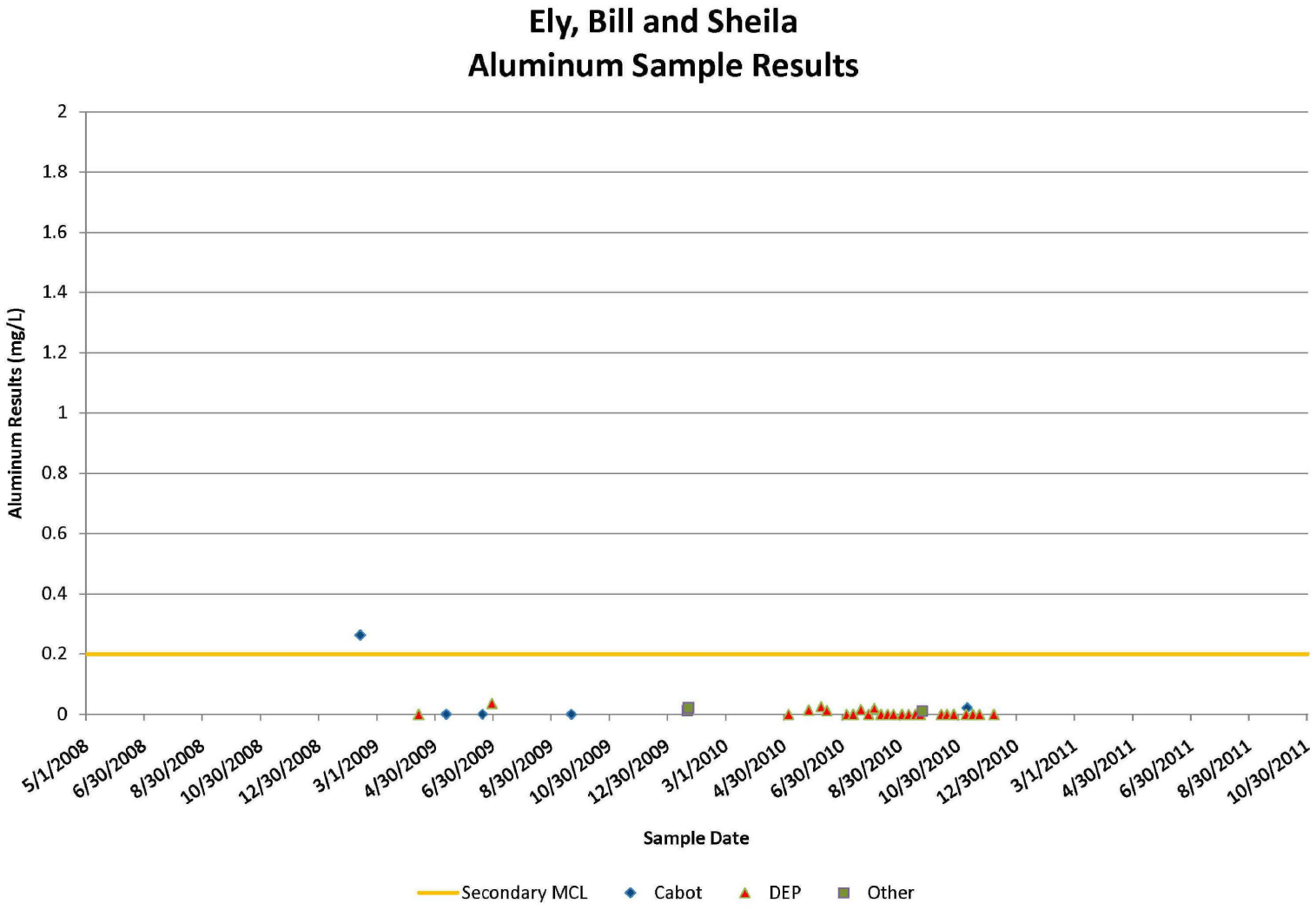
Ely, William – CGI and Dissolved Methane Graphs



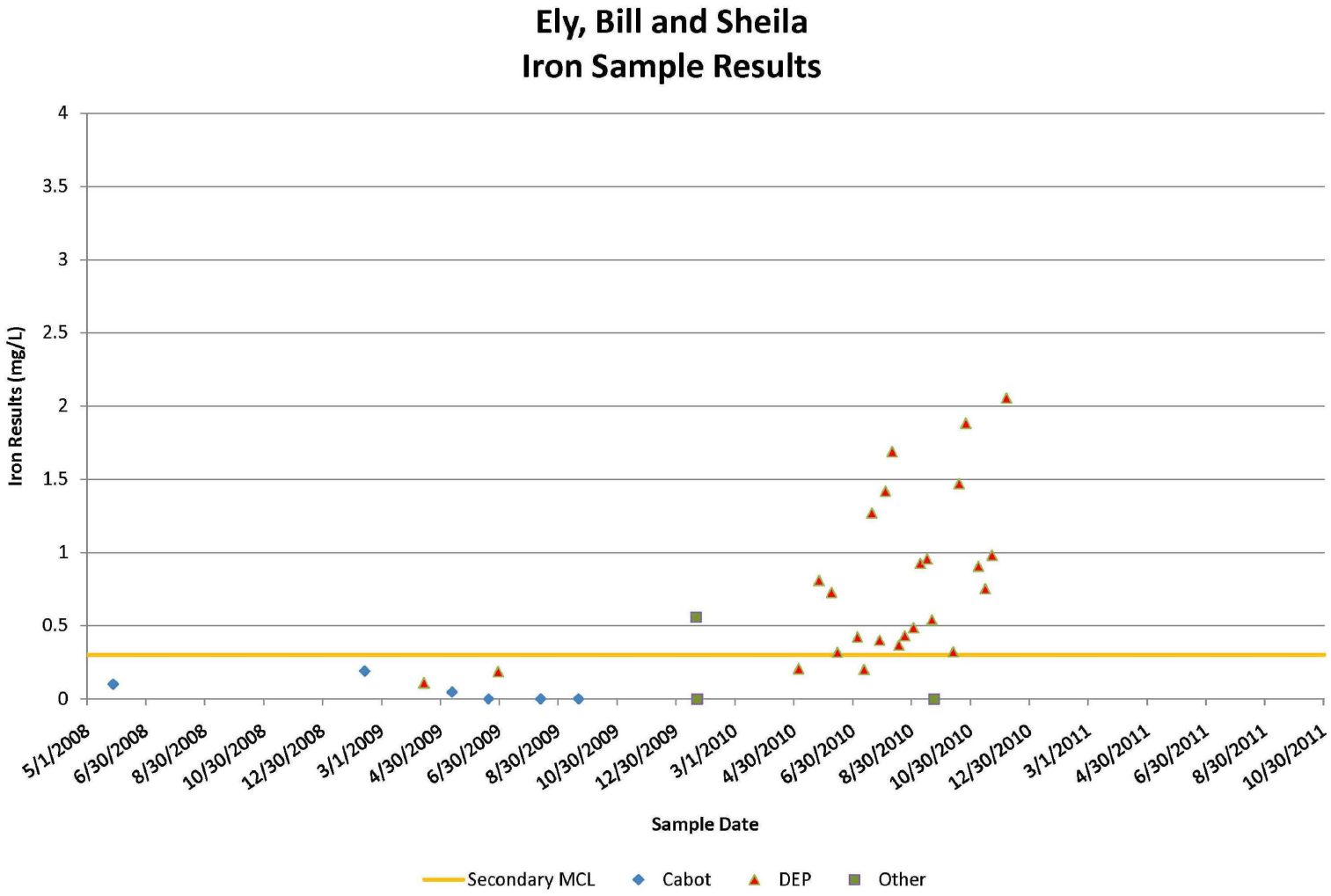
Ely, Bill and Sheila – CH4 results



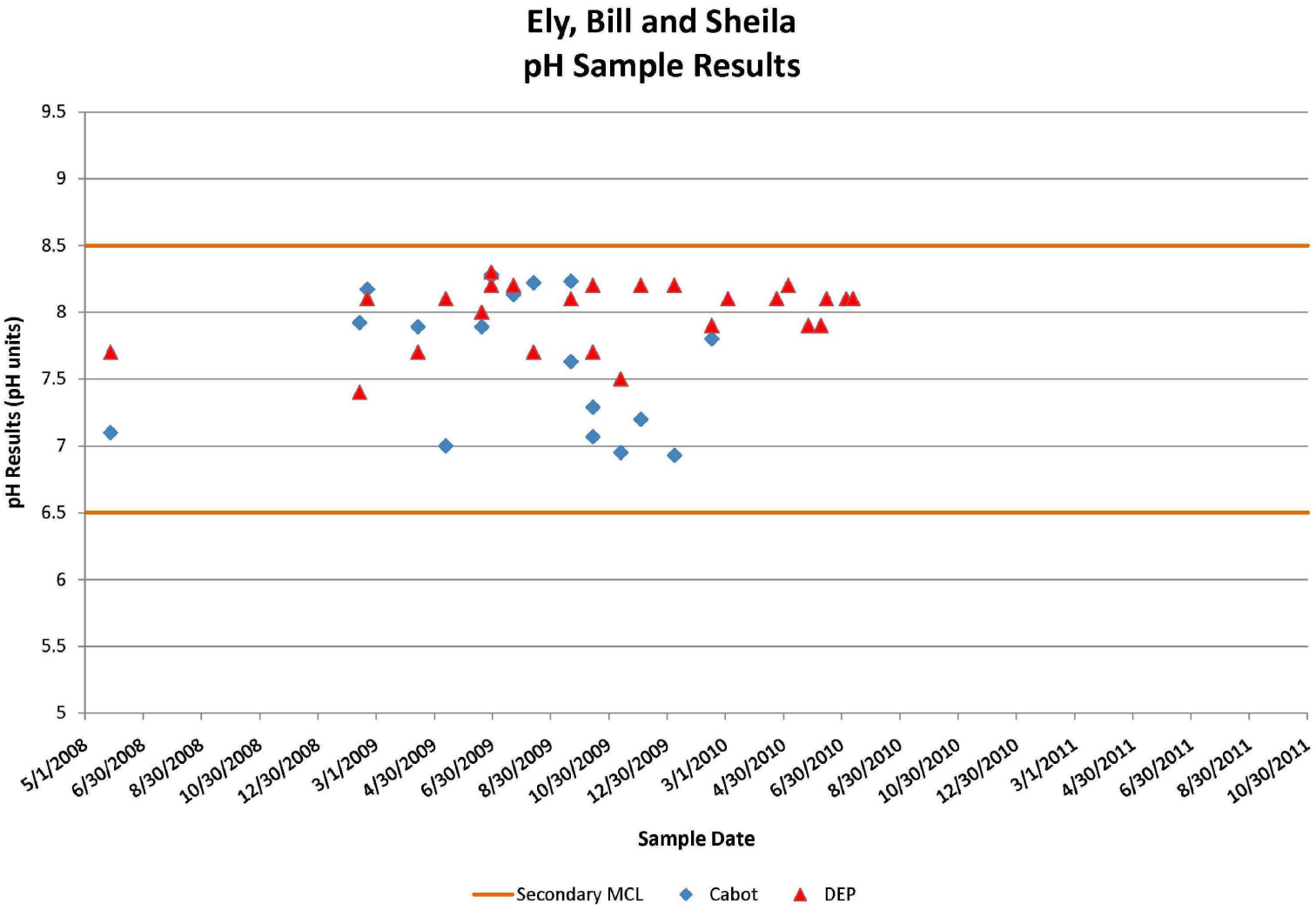
Ely, Bill and Sheila – Al results



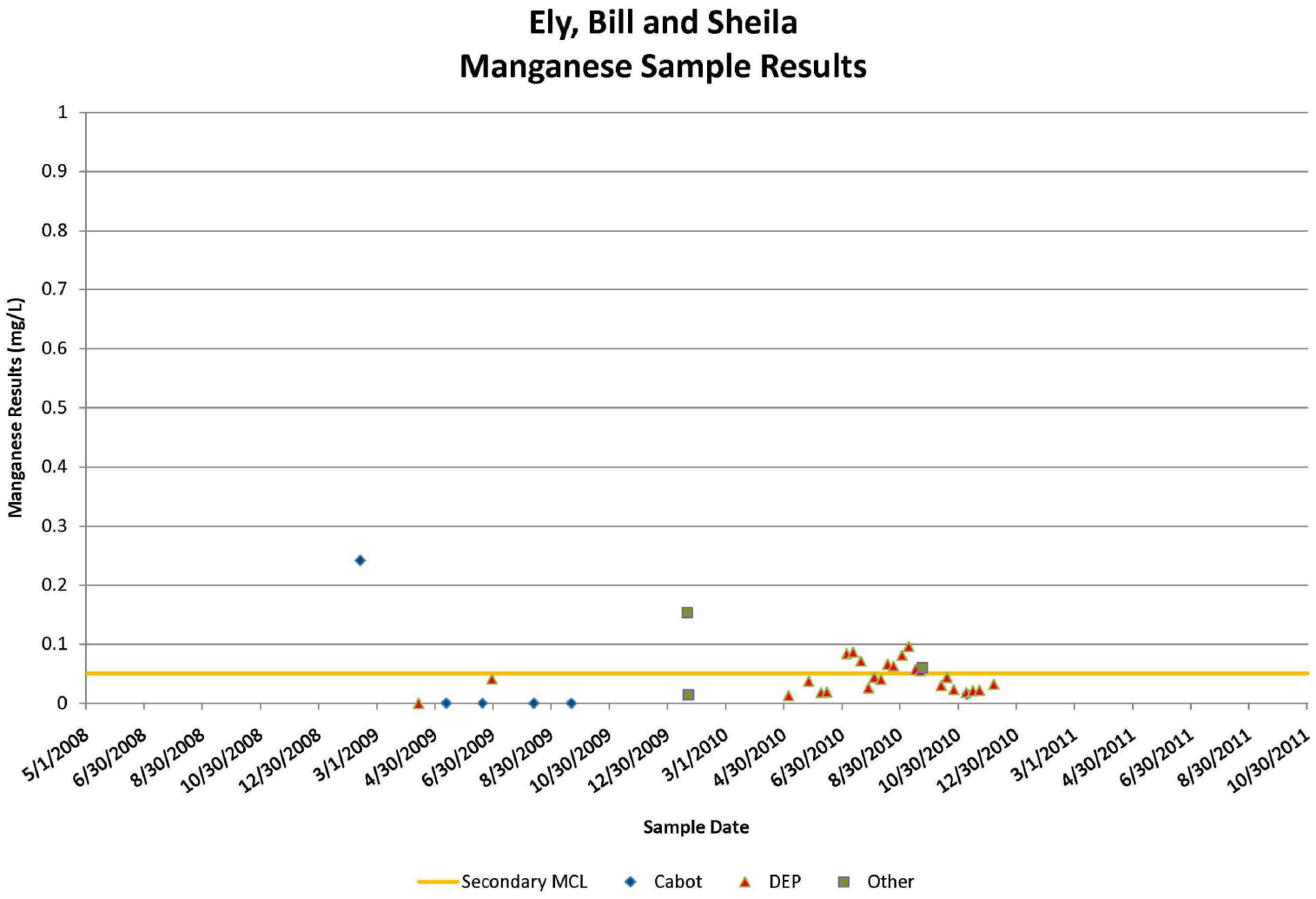
Ely, Bill and Sheila – Fe results



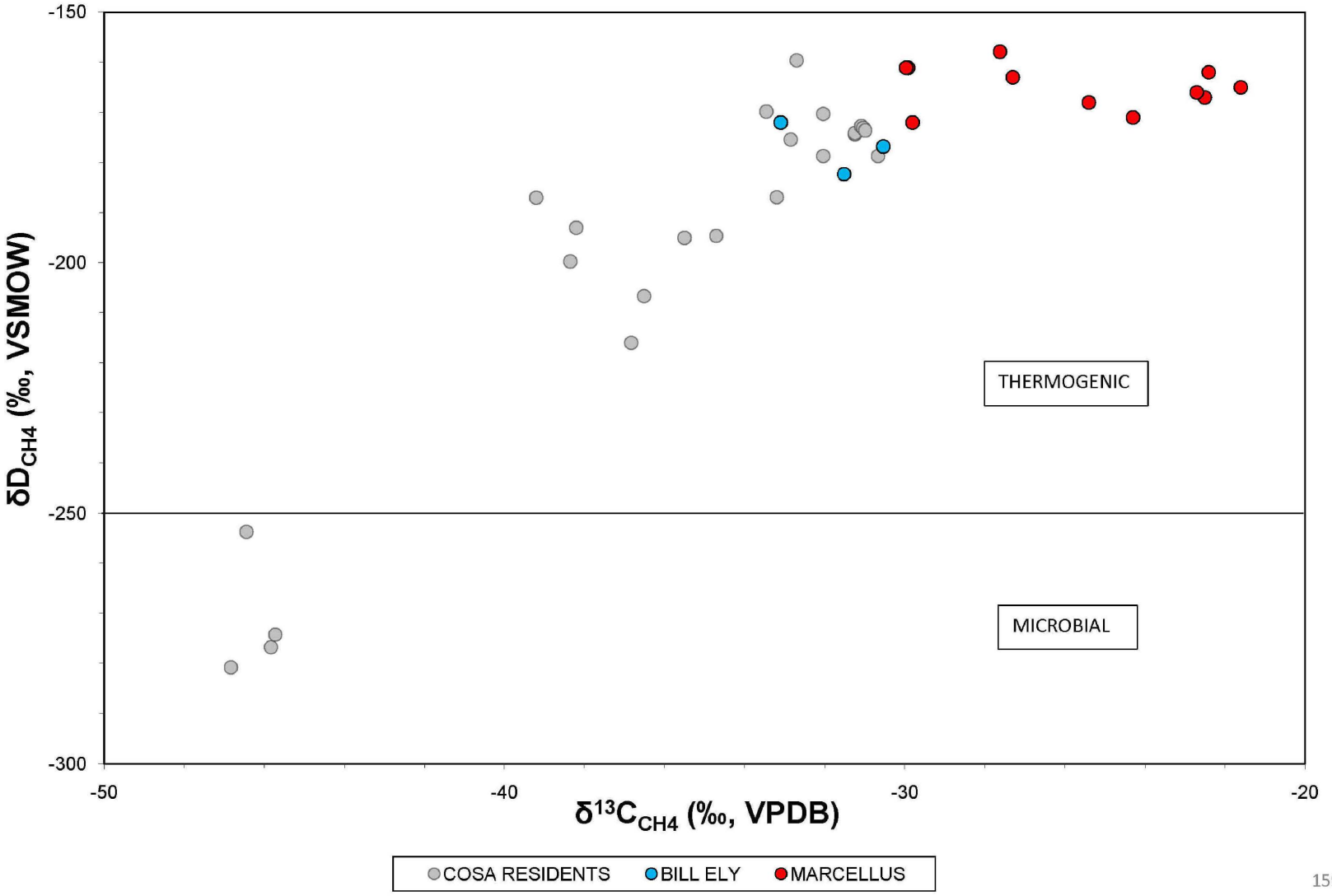
Ely, Bill and Sheila – pH results



Ely, Bill and Sheila – Mn results



Ely, Bill and Sheila – Isotopes



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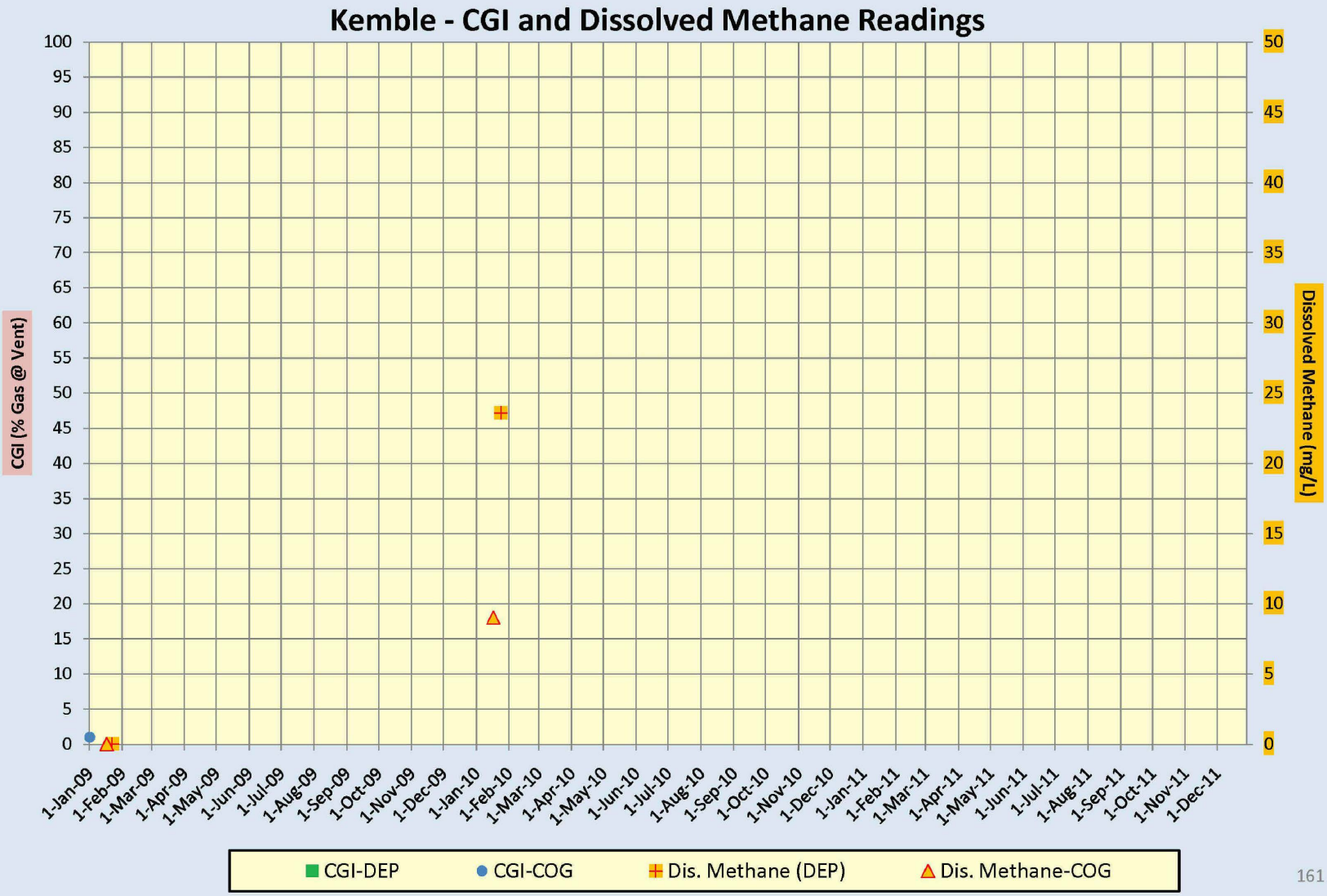
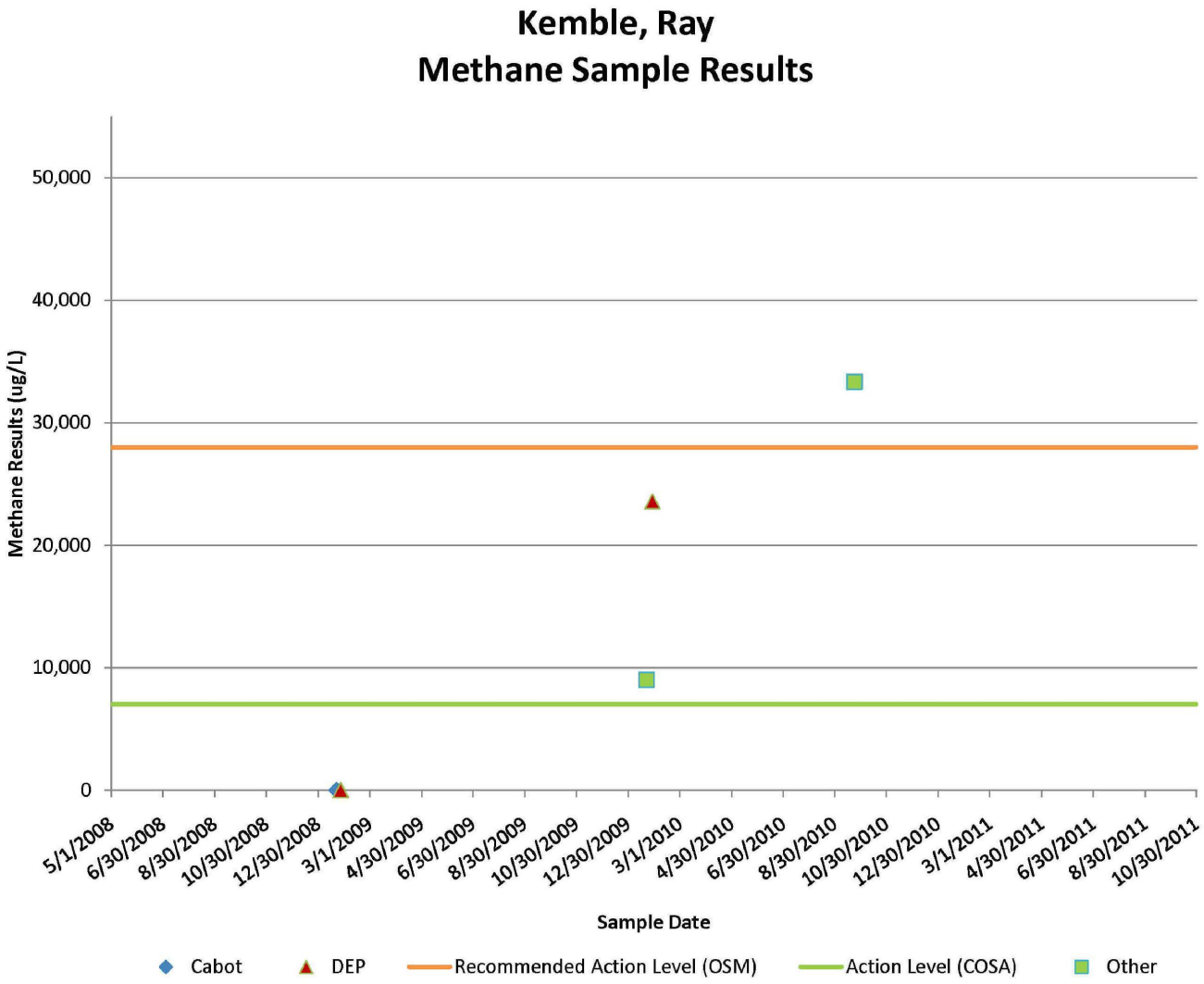
Kemble, Raymond – Water Well Summary

Water Well - Owner	Raymond Kemble
Exceed Primary:	None
Exceed Secondary:	None
Dissolved Gas:	Most Recent Result = 33.3 mg/L (9/23/2010)
Before Treatment:	N/A
After Treatment:	N/A
Gas Wells ≤ 1000':	Costello 1V
Gas Wells 1000' - 2500':	Costello 2V Ely 2V Ely 4V Ely 6H Gesford 3 - P&A Gesford 9V - P&A Lewis 2V
Plan Forward:	Offer treatment system.
Comments:	Receiving bottled and bulk water. Refusing to allow sampling. Refused treatment system.

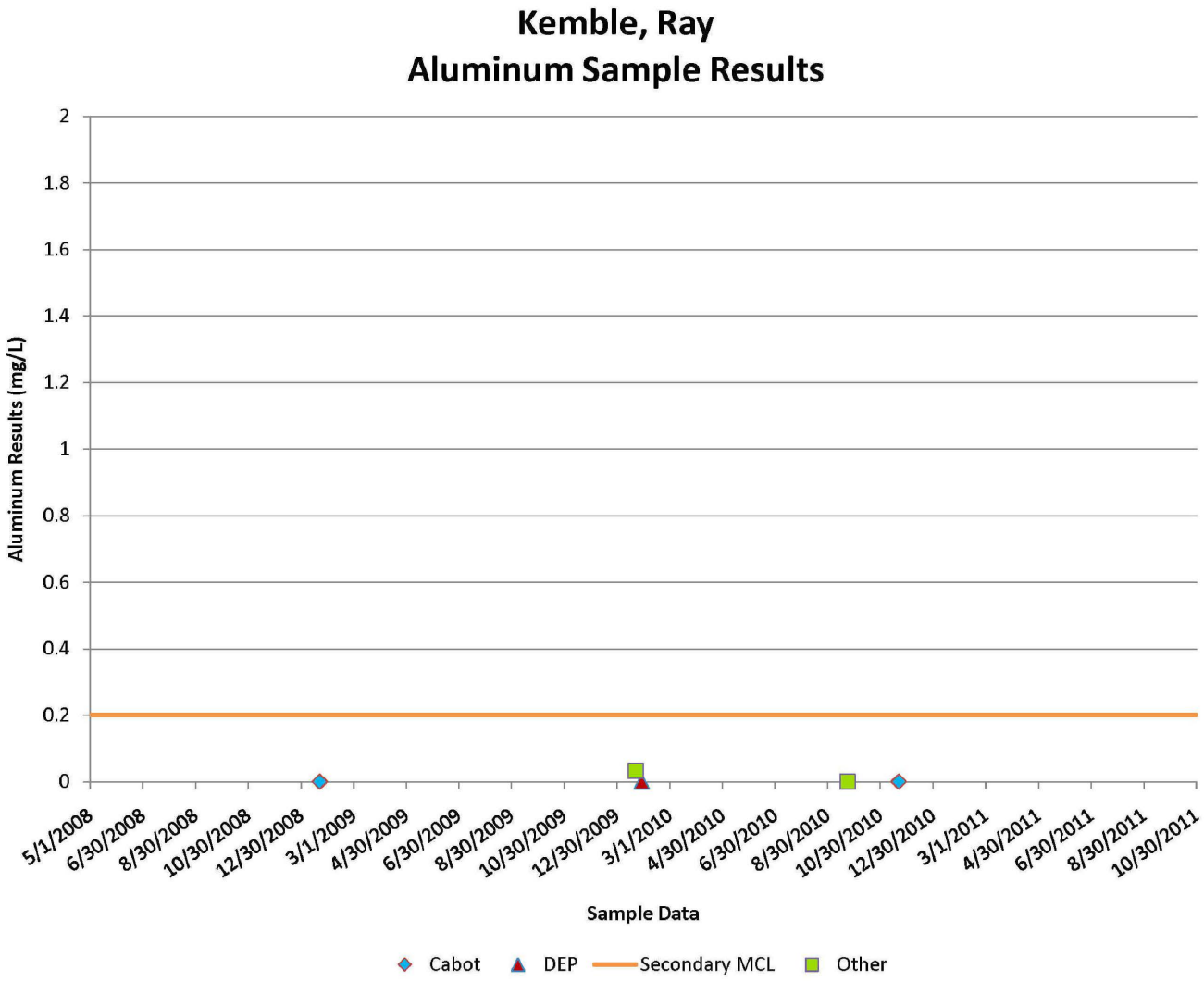
Kemble – CGI and Dissolved Methane Graphs



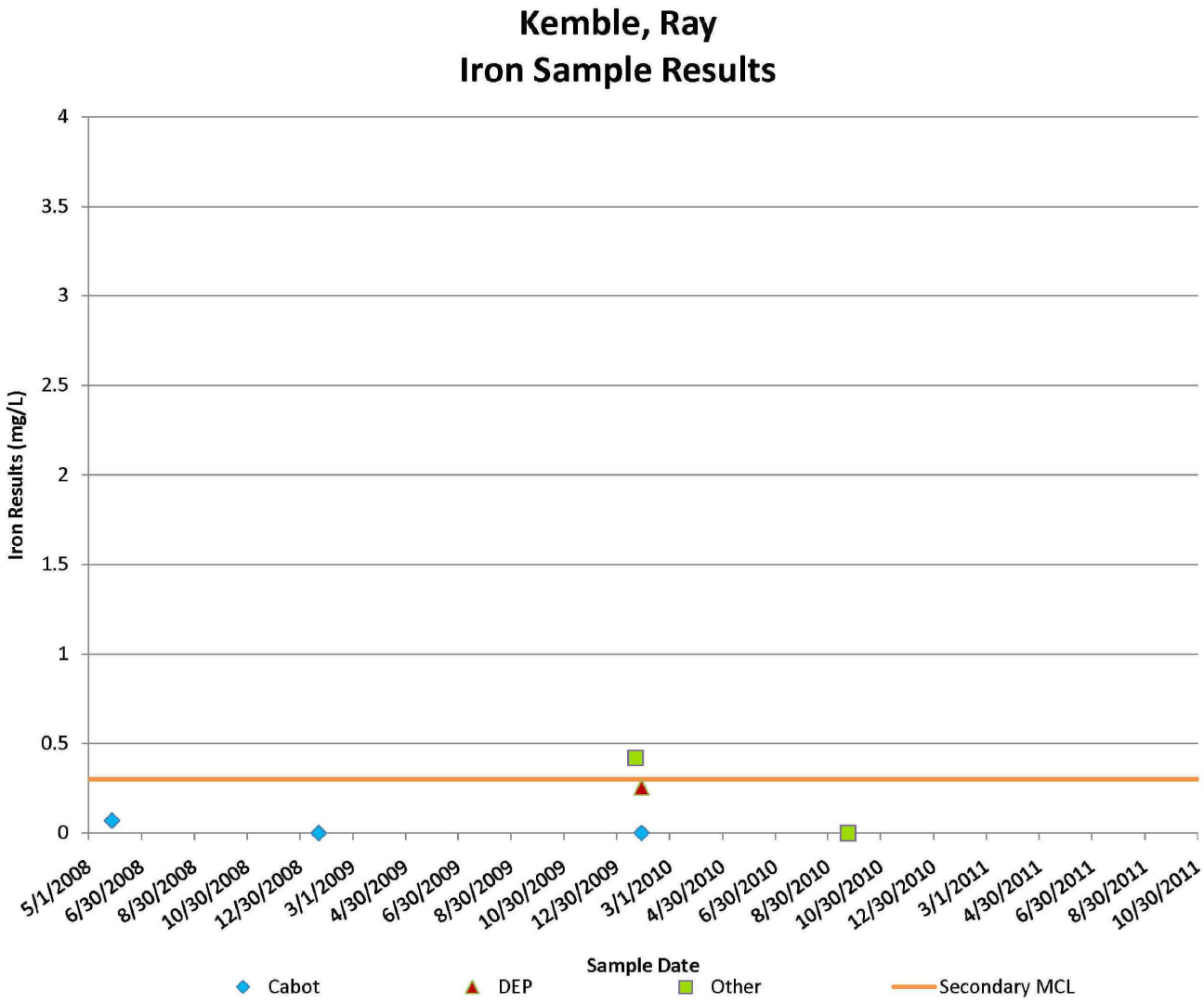
Kemble, Ray – CH4 results



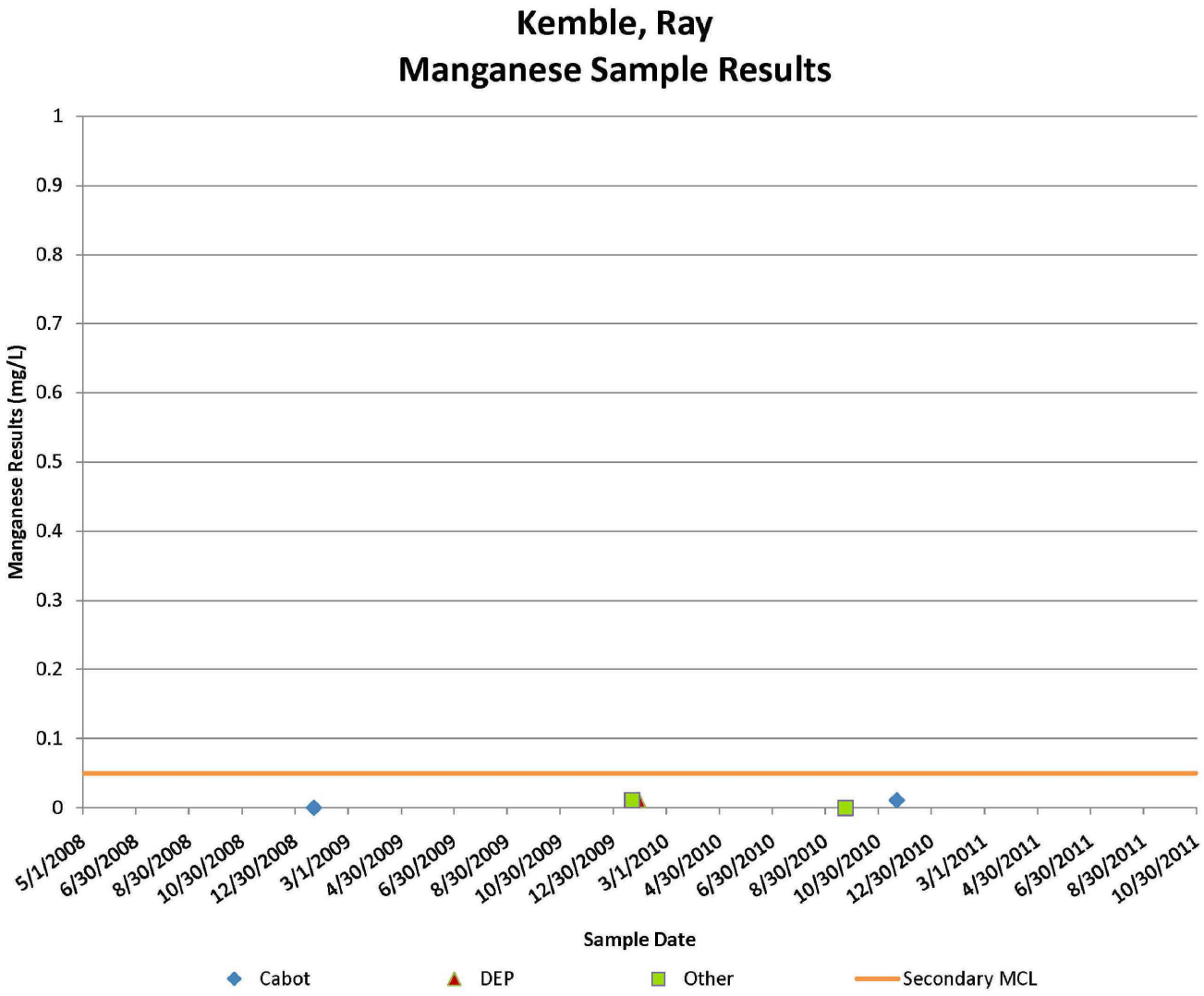
Kemble, Ray – Al results



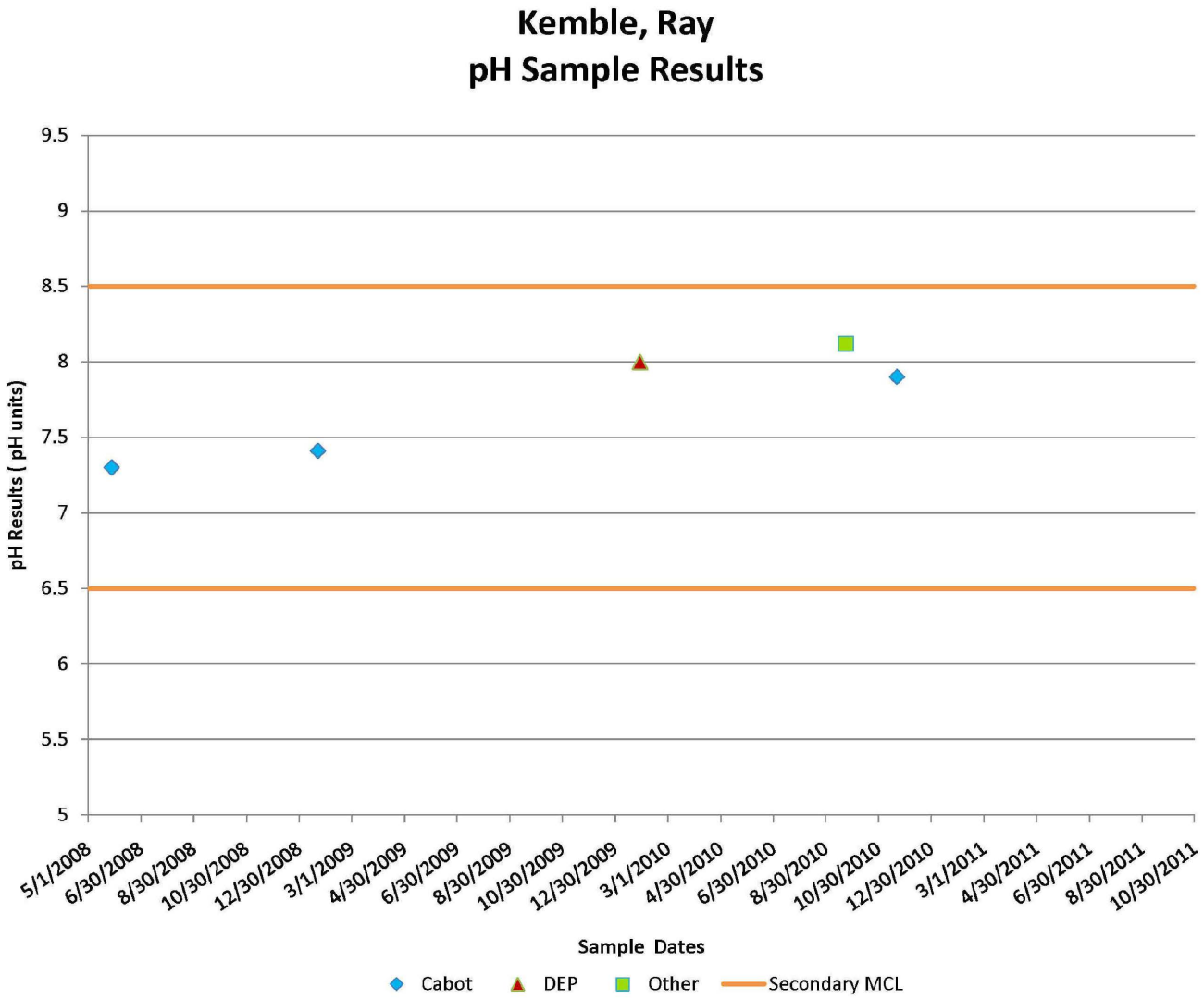
Kemble, Ray – Fe results



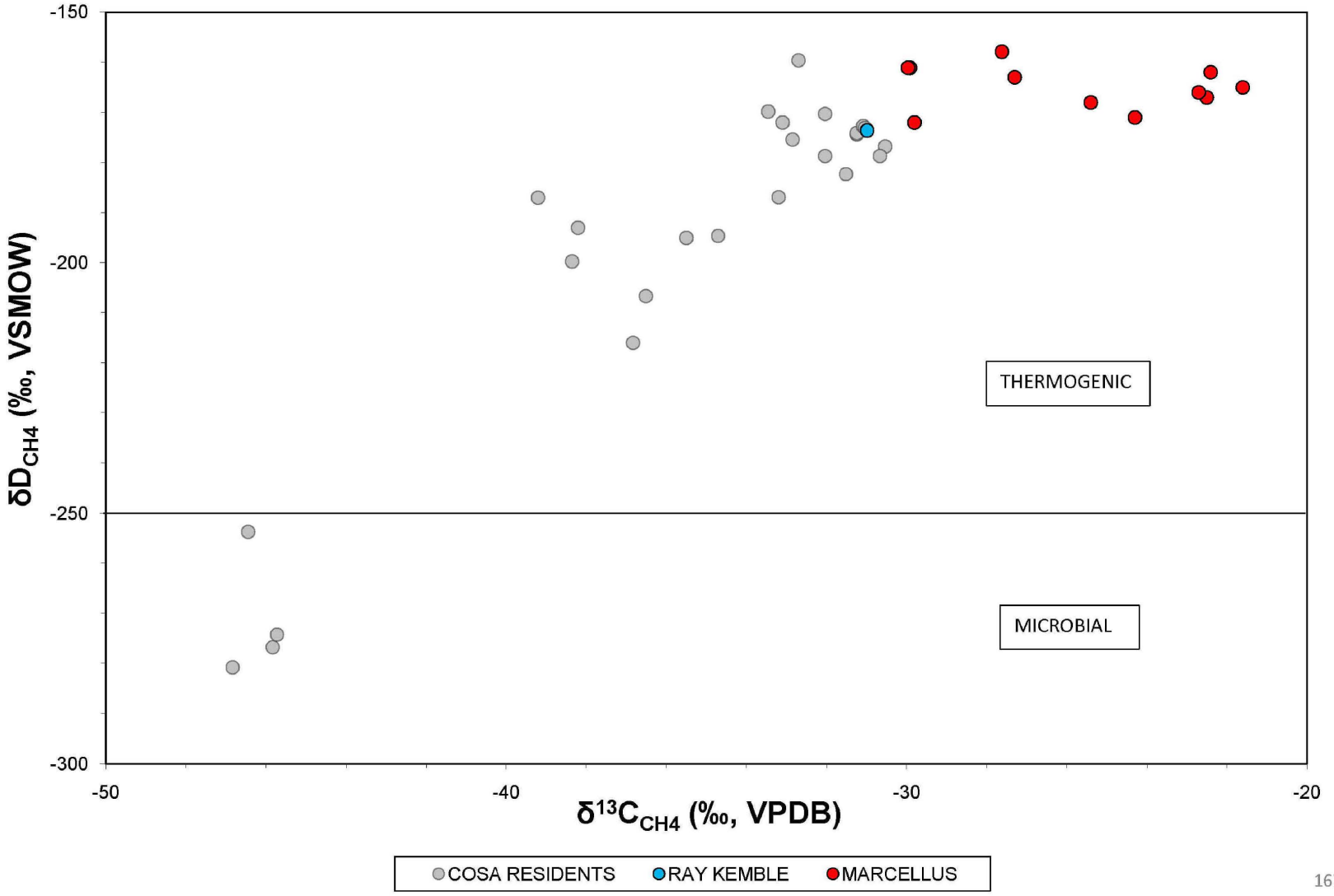
Kemble, Ray – Mn results



Kemble, Ray – pH results



Kemble, Ray – Isotopes



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Treatment System Evaluation

- Treatment System Design Goals
  - Methane Removal
  - Filtration – removes Total Suspended Solids and Total Metals
  - Disinfection – eliminates biological growth such as Coliform
- Under CO&SA dated April 15, 2010, where Cabot demonstrates that a resident refuses a treatment system then Cabot is deemed to have complied with ¶ 7.4.m. (obligation to replace or restore affected water supplies)

Treatment System Evaluation

Methane Sample Results Before and After Treatment

Resident	Date	Before (ug/L)	After (ug/L)	Percent Removed
Hein, Fred and Jessica	6/23/2011	17000	280	98%
Johnson, Michael and Suzanne	6/10/2011	1600	35	98%
Maye, Tim and Deb	8/24/2011	2200	99	96%
Salsman, Loren	8/3/2011	12000	190	98%

Most recent samples results are shown

Secondary MCL - Before and After Treatment System Results

Resident	Date	Total Suspended Solids		Aluminum		Iron		Manganese	
				Secondary MCL	0.2 mg/L	Secondary MCL	0.3 mg/L	Secondary MCL	0.05 mg/L
		Before (mg/L)	After (mg/L)	Before (mg/L)	After (mg/L)	Before (mg/L)	After (mg/L)	Before (mg/L)	After (mg/L)
Hein, Fred and Jessica	6/23/2011	5.6	<2	<0.05	0.048	0.093	<0.05	0.078	0.027
Johnson, Michael and Suzanne	6/10/2011	1350	20	44.1	1.08*	17.7	0.891*	1.92	<0.025
Maye, Tim and Deb	8/24/2011	140	<2	<0.1	<0.1	<0.5	<0.5	0.022	0.013
Salsman, Loren	8/3/2011		<2		0.138		<0.05		<0.015

Most recent samples results are shown

*Johnson's shocked chlorinated their well. Cabot performing sampling and analysis to confirm treatment worked.

Obligations Required to Stop Delivering Water

- ✓ Establish escrow funds
- ✓ Notify property owners of availability of escrow funds
- ✓ Notify property owners of availability of methane mitigation systems
- ✓ Receive written notice from the DEP that the above items (establish escrow and notify property owners) have been complied with

Water Recommendations

Group A - Stop Water Delivery and Continue Sampling as per CO&SA

- **Methane below 7 mg/L or below 5 mg/L with treatment system installed**

Resident	Methane Concentration in mg/L (Most Recent)	Treatment System Installation Status
Burke	0.014	Installed
Carter	5.35	System Declined
Fiorentino	0.5	System Declined
Hein	18	Installed
Johnson	0.88	Installed
Maye	2.2	Installed
Salsman	12	Installed
Sautner	<0.026	System Declined – water sampling refused
Seymour	1.6	System Declined
Stover	13	Installed
Switzer	3.18	System Declined
Teel	0.04	System Accepted, but Elected Not to Install

Group B - Stop Water Delivery – Biogenic Gas

Resident	Methane Concentration in mg/L (Most Recent)	Treatment System Installation Status
Roos	26.1 (Biogenic)	System Declined

Water Recommendations (cont'd)

Group C - Stop Water Delivery – Continue Sampling to establish background Treatment System Declined

Resident	Methane Concentration in mg/L (Most Recent)	Treatment System Installation Status
Ely, Scott	31.9	System Declined
Hubert	8.5	System Declined

Group D - Stop Water Delivery -- Water Sampling Refused DEP to initiate water sampling to establish background

Resident	Methane Concentration in mg/L	Treatment System Installation Status
Ely, Bill	48.5 (12/2010)	System Declined
Ely, Mike	40.6 (11/2010)	System Declined
Kemble	33.3 (09/2010)	System Declined

Gas Well Summary

Recent Activities

- Determine annular flow rate
- 48 hour pressure buildups on annuli
- Ran temp/noise logs on selected wells

Category I

Gas present in the annular space between the intermediate casing and the surface casing.

Category I (6 wells)

- 5 wells - annular pressure decrease or temp/noise log shows no gas migration
- 1 well - annular pressure increased

Brooks 1H

Gas Well: Brooks 1H

Category: I

	Size	Depth	TOC	80% FW Gradient
Surface Pipe:	9-5/8	1,289	Surface	447
Intermediate Pipe:	7	1,562	Surface	541
Production:	4-1/2	9,438	None	-

	24 Hour		48 Hour	
	11/2010	9/2011	11/2010	9/2011
7 x 9 Annulus				
Pressure PSI:	75	124	110	190
Rate MCFD:	-	0	-	-

	24 Hour		48 Hour	
	11/2010	9/2011	11/2010	9/2011
4 x 7 Annulus:				
Pressure PSI:	0	0	0	1
Rate MCFD:	-	0	-	-

Water wells > 7 MG/L:

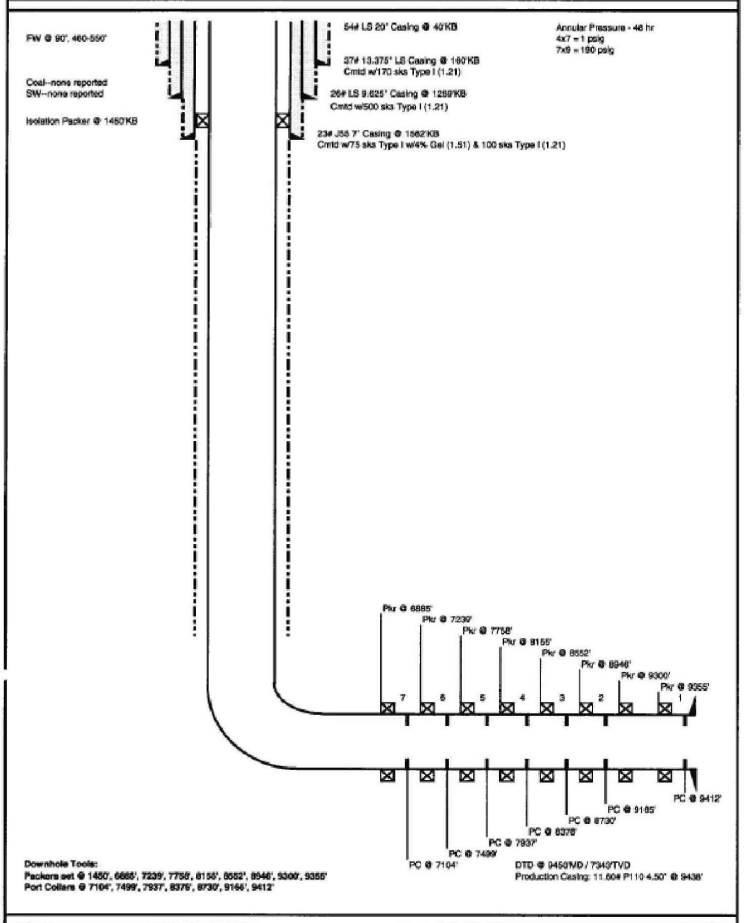
≤ 1000'	None
1000'-2500'	None

Plan Forward: Cement squeeze 4-1/2" annular space, vent annulus.

Comments:

Brooks 1H

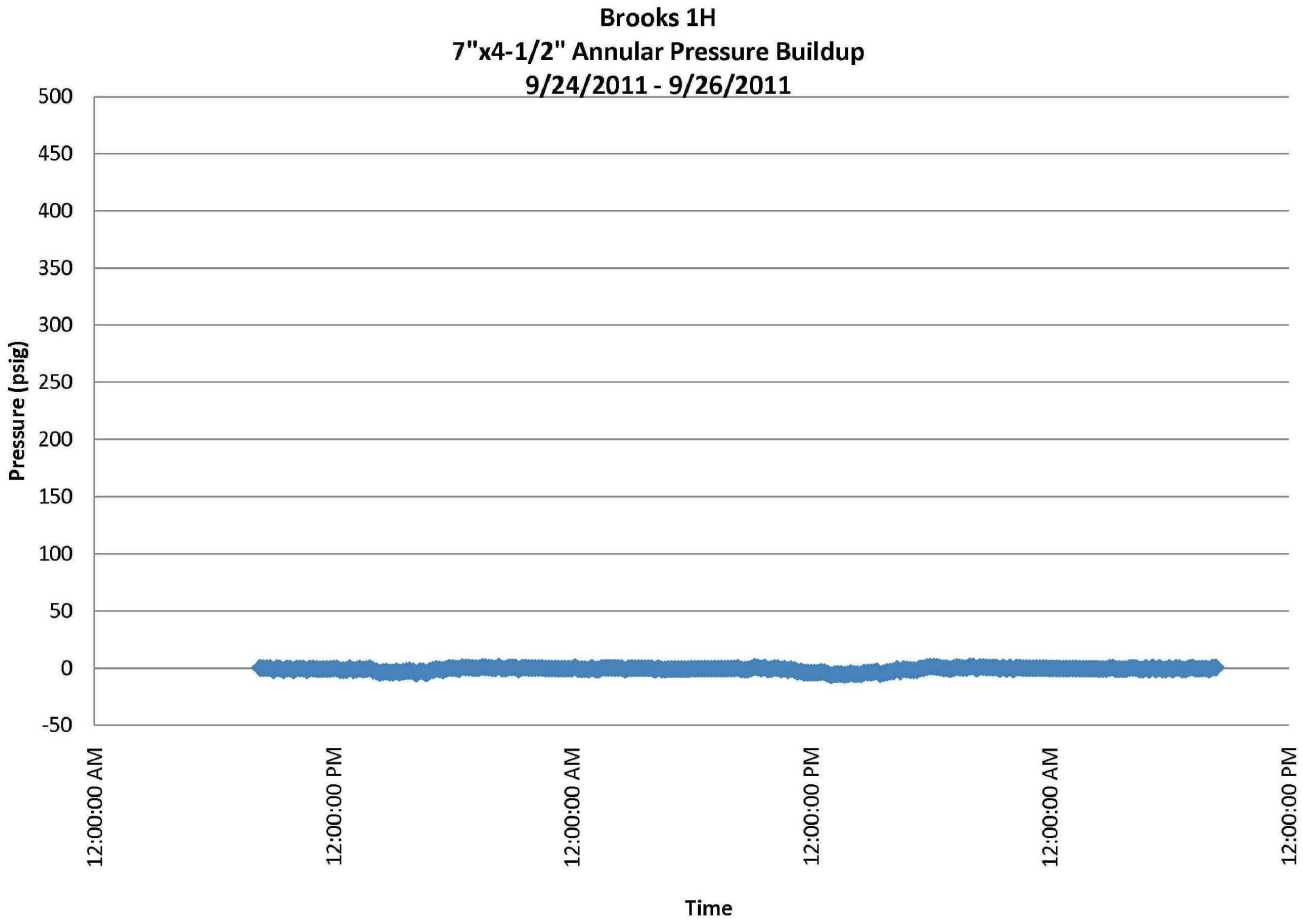
Well Name:	Brooks 1H	**County, State:**	Susquehanna Co. PA
API Number:	37-115-20051	**TIL Date:**	
AFE Number:		**TIL Rate:**	
Drilling Rig:		**Surf. Latitude:**	
Drilled:	10/06--11/23/08	**Surf. Longitude:**	
Completed:		**KB Elevation:**	1220'
Final Open Flow:		**Ground Elevation:**	1210'



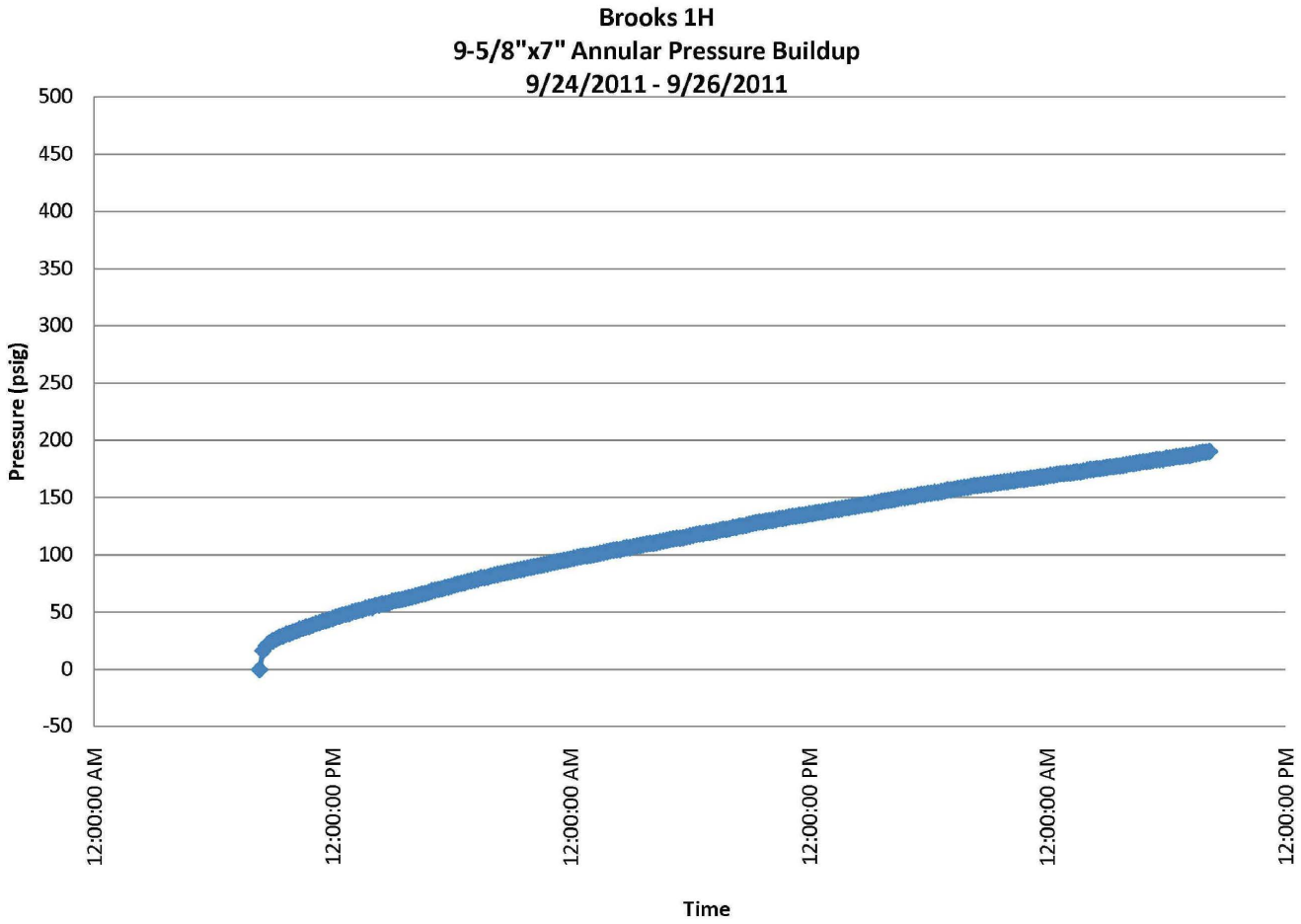
Downhole Tools: Packers Plus
Stimulation:

Schematic is not to scale

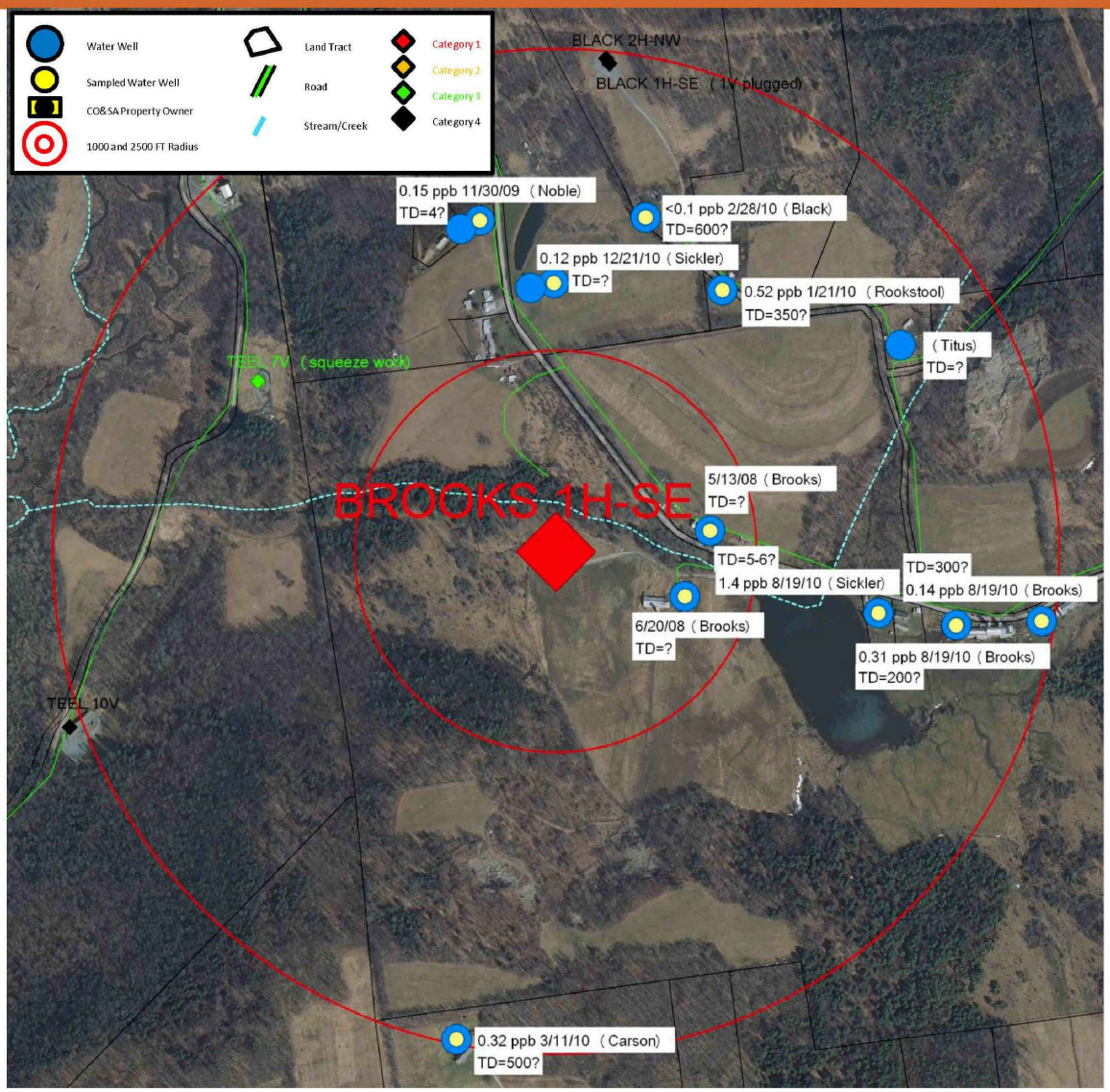
Brooks 1H


Brooks 1H
7"x4-1/2" Annular Pressure Buildup
9/24/2011 - 9/26/2011
Pressure (psig)
500
450
400
350
300
250
200
150
100
50
0
-50
12:00:00 AM
12:00:00 PM
12:00:00 AM
12:00:00 PM
12:00:00 AM
12:00:00 PM
Time

Brooks 1H


Brooks 1H
9-5/8"x7" Annular Pressure Buildup
9/24/2011 - 9/26/2011
Pressure (psig)
500
450
400
350
300
250
200
150
100
50
0
-50
12:00:00 AM
12:00:00 PM
12:00:00 AM
12:00:00 PM
12:00:00 AM
12:00:00 PM
Time

Brooks 1H - SE


Water Well
Sampled Water Well
CO&SA Property Owner
1000 and 2500 FT Radius
Land Tract
Road
Stream/Creek
Category 1
Category 2
Category 3
Category 4
BLACK 2H-NW
BLACK 1H-SE (1V plugged)
0.15 ppb 11/30/09 (Noble)
TD=4?
<0.1 ppb 2/28/10 (Black)
TD=600?
0.12 ppb 12/21/10 (Sickler)
TD=?
0.52 ppb 1/21/10 (Rookstool)
TD=350?
(Titus)
TD=?
TEEL 7V (squeeze work)
BROOKS 1H-SE
5/13/08 (Brooks)
TD=?
TD=5-6?
1.4 ppb 8/19/10 (Sickler)
TD=300?
0.14 ppb 8/19/10 (Brooks)
6/20/08 (Brooks)
TD=?
0.31 ppb 8/19/10 (Brooks)
TD=200?
TEEL 10V
0.32 ppb 3/11/10 (Carson)
TD=500?

Ely 4V

Gas Well: Ely 4V

Category: I

	Size	Depth	TOC	80% FW Gradient
Surface Pipe:	9-5/8	406	Surface	141
Intermediate Pipe:	7	1,490	Surface	516
Production:	4-1/2	7,225	1,116	-

	24 Hour		48 Hour	
	12/2010	9/2011	12/2010	9/2011
7 x 9 Annulus				
Pressure PSI:	2	0	2	0
Rate MCFD:	0	0	0	0

	24 Hour		48 Hour	
	12/2010	10/2011	12/2010	10/2011
4 x 7 Annulus:				
Pressure PSI:	0	0	0	0
Rate MCFD:	-	0	-	-

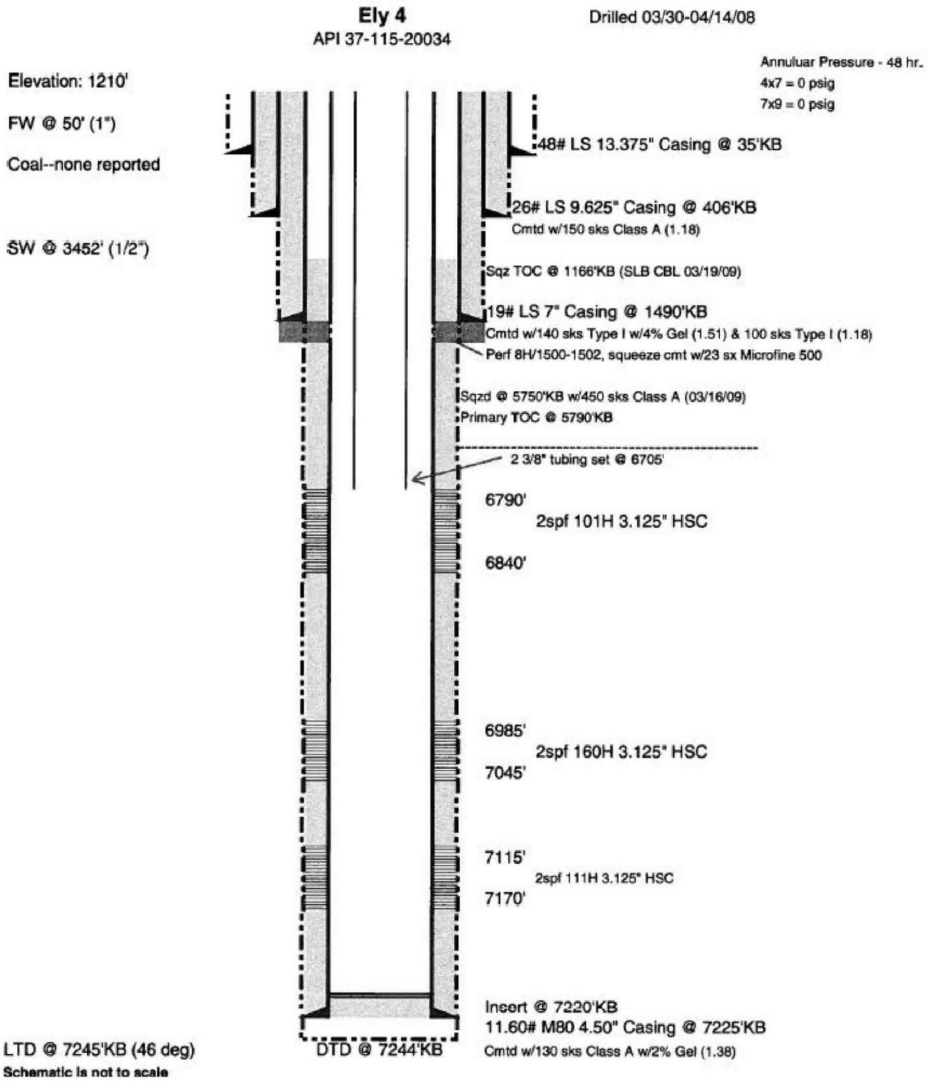
Water wells > 7 MG/L:

≤ 1000'	None
1000'-2500'	Kemble

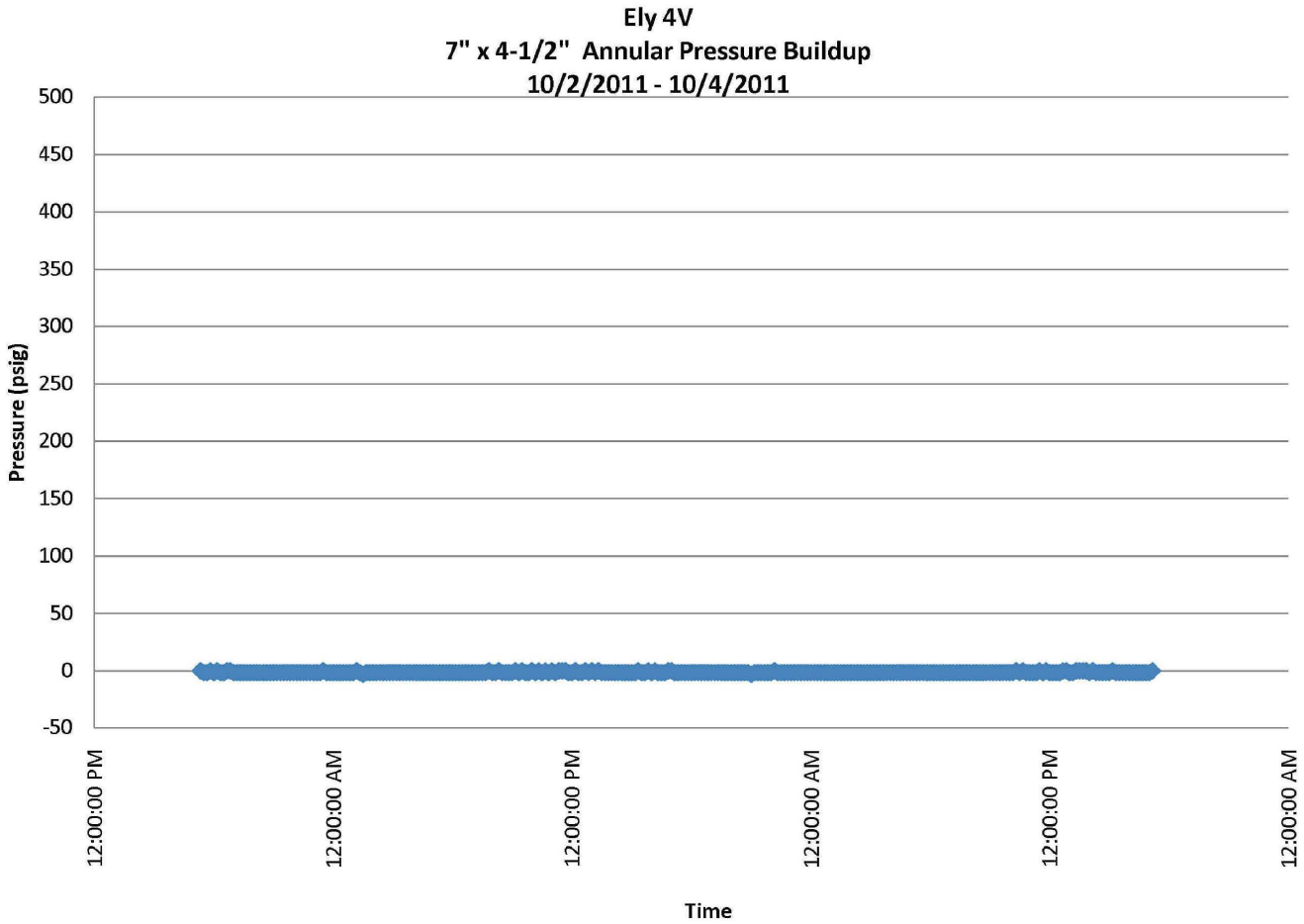
Plan Forward: Vent Annulus.

Comments: Squeeze cement in 4-1/2 annulus – 5/11/10.

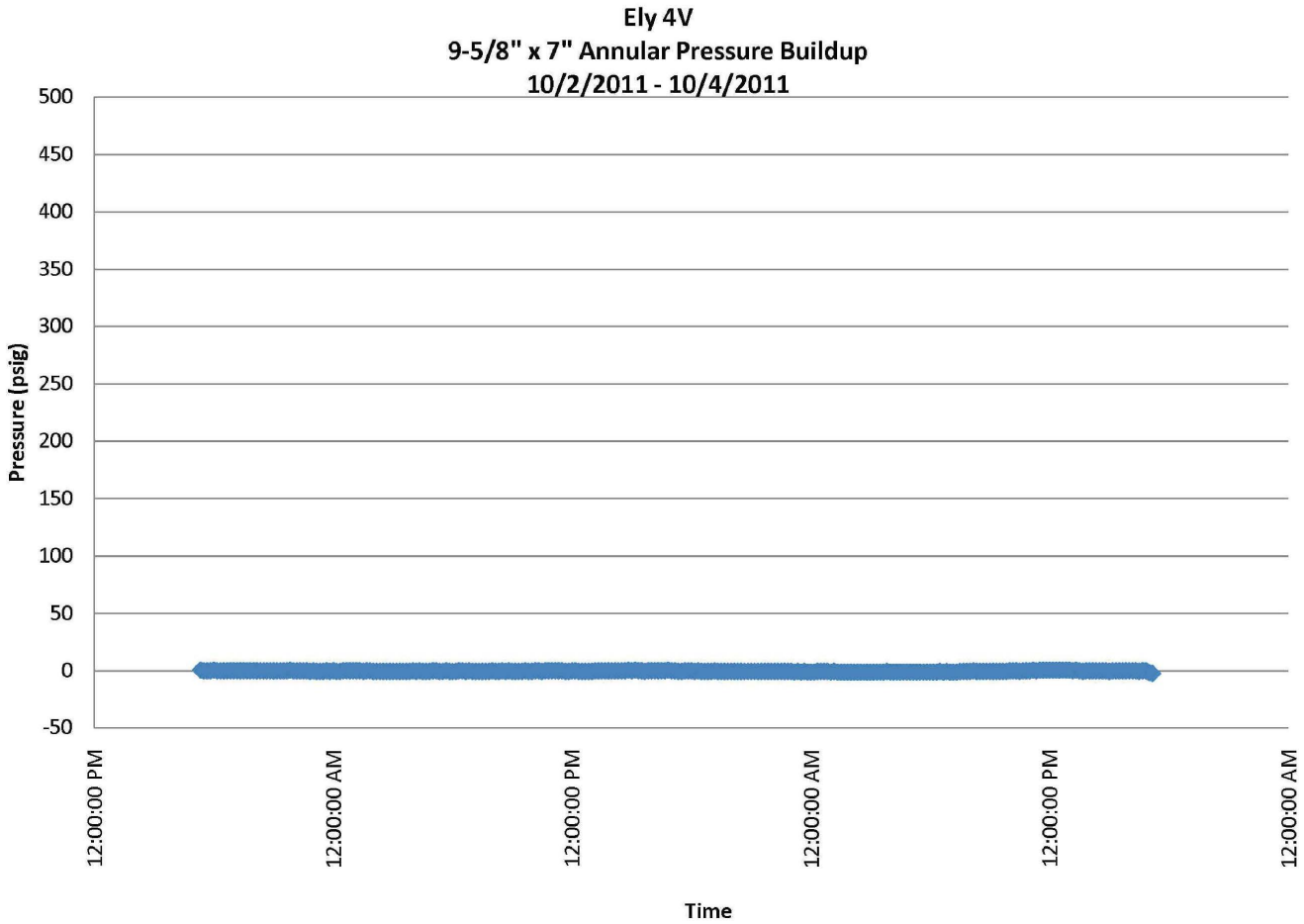
Ely 4V


Ely 4
API 37-115-20034
Drilled 03/30-04/14/08
Annuluar Pressure - 48 hr.
4x7 = 0 psig
7x9 = 0 psig
Elevation: 1210'
FW @ 50' (1")
Coal--none reported
SW @ 3452' (1/2")
48# LS 13.375" Casing @ 35'KB
26# LS 9.625" Casing @ 406'KB
Cmtd w/150 sks Class A (1.18)
Sqz TOC @ 1166'KB (SLB CBL 03/19/09)
19# LS 7" Casing @ 1490'KB
Cmtd w/140 sks Type I w/4% Gel (1.51) & 100 sks Type I (1.18)
Perf 8H/1500-1502, squeeze cmt w/23 sx Microfine 500
Sqzd @ 5750'KB w/450 sks Class A (03/16/09)
Primary TOC @ 5790'KB
2 3/8" tubing set @ 6705'
6790'
2spf 101H 3.125" HSC
6840'
6985'
2spf 160H 3.125" HSC
7045'
7115'
2spf 111H 3.125" HSC
7170'
Insert @ 7220'KB
11.60# M80 4.50" Casing @ 7225'KB
Cmtd w/130 sks Class A w/2% Gel (1.38)
LTD @ 7245'KB (46 deg)
DTD @ 7244'KB
Schematic is not to scale

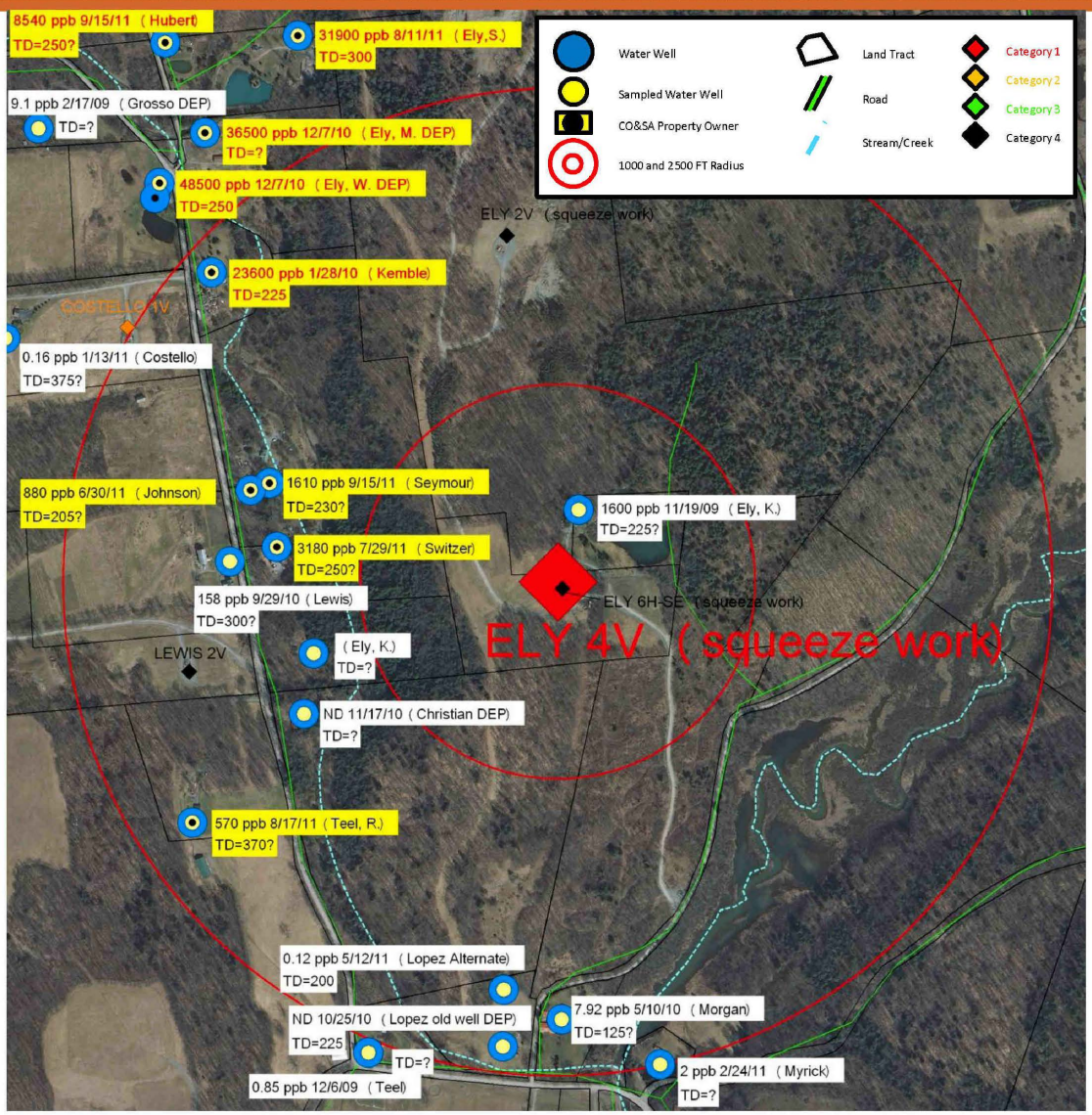
Ely 4V


Ely 4V
7" x 4-1/2" Annular Pressure Buildup
10/2/2011 - 10/4/2011
Pressure (psig)
500
450
400
350
300
250
200
150
100
50
0
-50
12:00:00 PM
12:00:00 AM
12:00:00 PM
12:00:00 AM
12:00:00 PM
12:00:00 AM
Time

Ely 4V


Ely 4V
9-5/8" x 7" Annular Pressure Buildup
10/2/2011 - 10/4/2011
Pressure (psig)
500
450
400
350
300
250
200
150
100
50
0
-50
12:00:00 PM
12:00:00 AM
12:00:00 PM
12:00:00 AM
12:00:00 PM
12:00:00 AM
Time

Ely 4V


8540 ppb 9/15/11 (Hubert)
TD=250?
31900 ppb 8/11/11 (Ely,S.)
TD=300
9.1 ppb 2/17/09 (Grosso DEP)
TD=?
36500 ppb 12/7/10 (Ely, M. DEP)
TD=?
48500 ppb 12/7/10 (Ely, W. DEP)
TD=250
ELY 2V (squeeze work)
23600 ppb 1/28/10 (Kemble)
TD=225
COSTELLO 1V
0.16 ppb 1/13/11 (Costello)
TD=375?
880 ppb 6/30/11 (Johnson)
TD=205?
1610 ppb 9/15/11 (Seymour)
TD=230?
1600 ppb 11/19/09 (Ely, K.)
TD=225?
3180 ppb 7/29/11 (Switzer)
TD=250?
158 ppb 9/29/10 (Lewis)
TD=300?
ELY 6H-SE (squeeze work)
ELY 4V (squeeze work)
LEWIS 2V
(Ely, K.)
TD=?
ND 11/17/10 (Christian DEP)
TD=?
570 ppb 8/17/11 (Teel, R.)
TD=370?
0.12 ppb 5/12/11 (Lopez Alternate)
TD=200
ND 10/25/10 (Lopez old well DEP)
TD=225
TD=?
7.92 ppb 5/10/10 (Morgan)
TD=125?
2 ppb 2/24/11 (Myrick)
TD=?
0.85 ppb 12/6/09 (Teel)
Water Well
Sampled Water Well
CO&SA Property Owner
1000 and 2500 FT Radius
Land Tract
Road
Stream/Creek
Category 1
Category 2
Category 3
Category 4

Ely 5H

Gas Well: Ely 5H

Category: I

	Size	Depth	TOC	80% FW Gradient
Surface Pipe:	9-5/8	1,110	Surface	385
Intermediate Pipe:	7	2,020	Surface	700
Production:	4-1/2	9,690	760	-

	24 Hour		48 Hour	
	11/2010	9/2011	11/2010	9/2011
7 x 9 Annulus				
Pressure PSI:	12	1	14	1
Rate MCFD:	-	0	-	-

	24 Hour		48 Hour	
	11/2010	9/2011	11/2010	9/2011
4 x 7 Annulus:				
Pressure PSI:	20	0	29	0
Rate MCFD:	-	0	-	-

Water wells > 7 MG/L:

≤ 1000' None

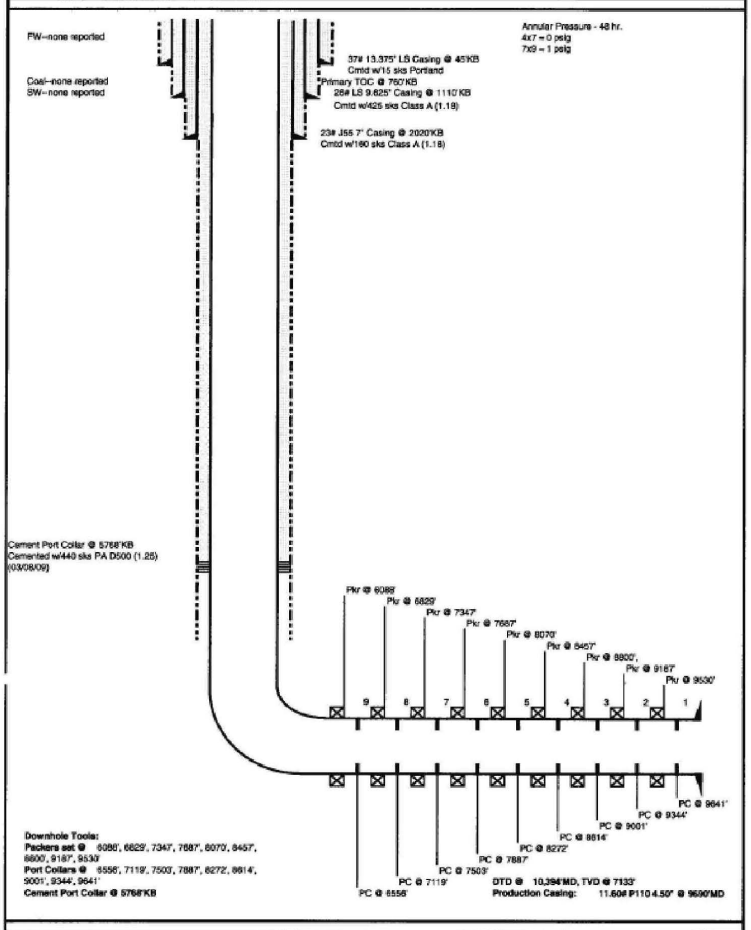
1000'-2500' S. Ely, F. Kinner, H. Kinner

Plan Forward: Vent Annulus

Comments: Temp/Noise log run. No indication of gas migration. 10/1/11

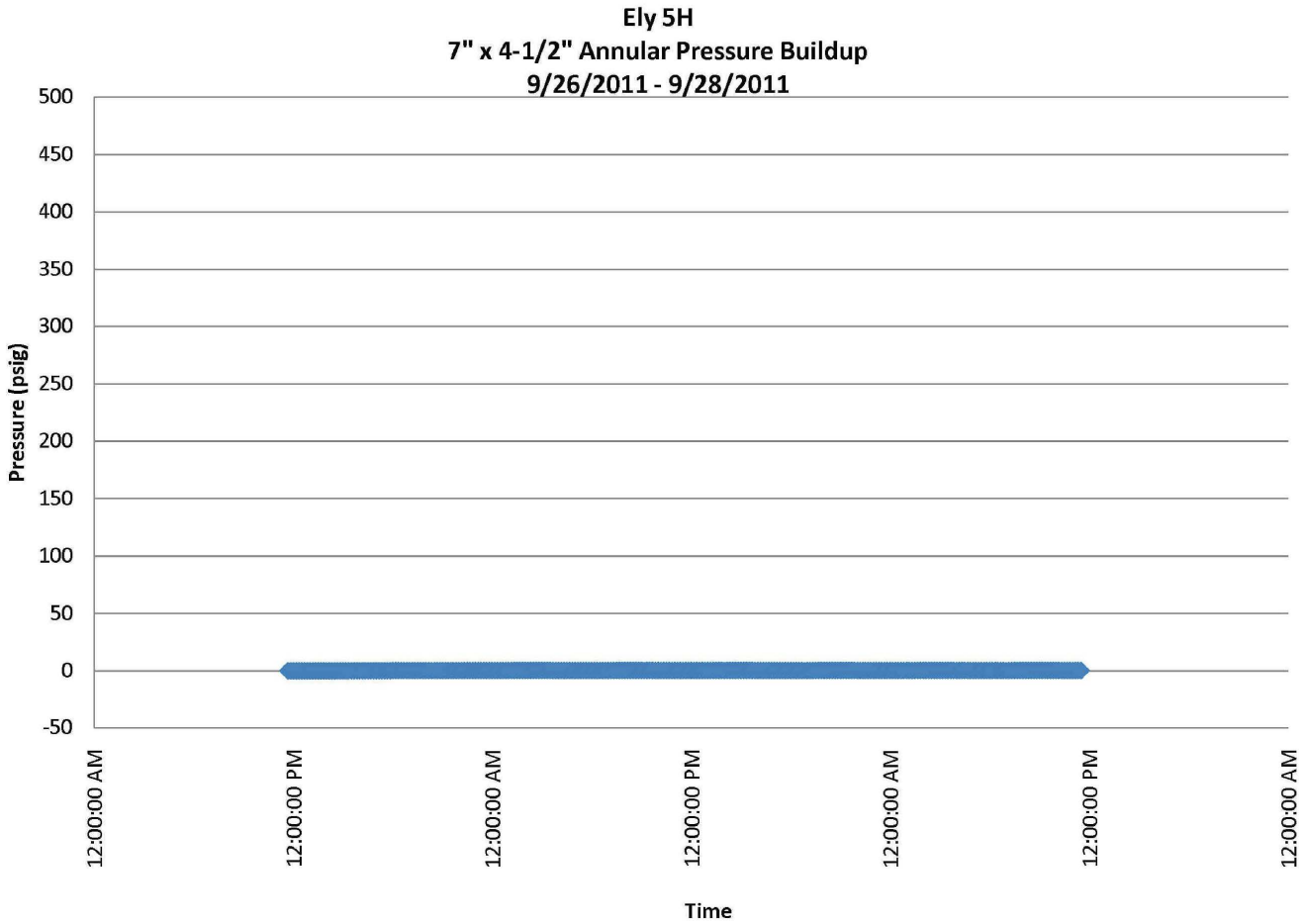
Ely 5H

Well Name:	Ely 5H	**County, State:**	Susquehanna Co. PA
API Number:	37-115-20054	**TIL Date:**	
AFE Number:		**TIL Rate:**	
Drilling Rig:		**Surf. Latitude:**	
Drilled:	12/07/08--02/03/09	**Surf. Longitude:**	
Completed:		**KB Elevation:**	1550'
Final Open Flow:		**Ground Elevation:**	1540'

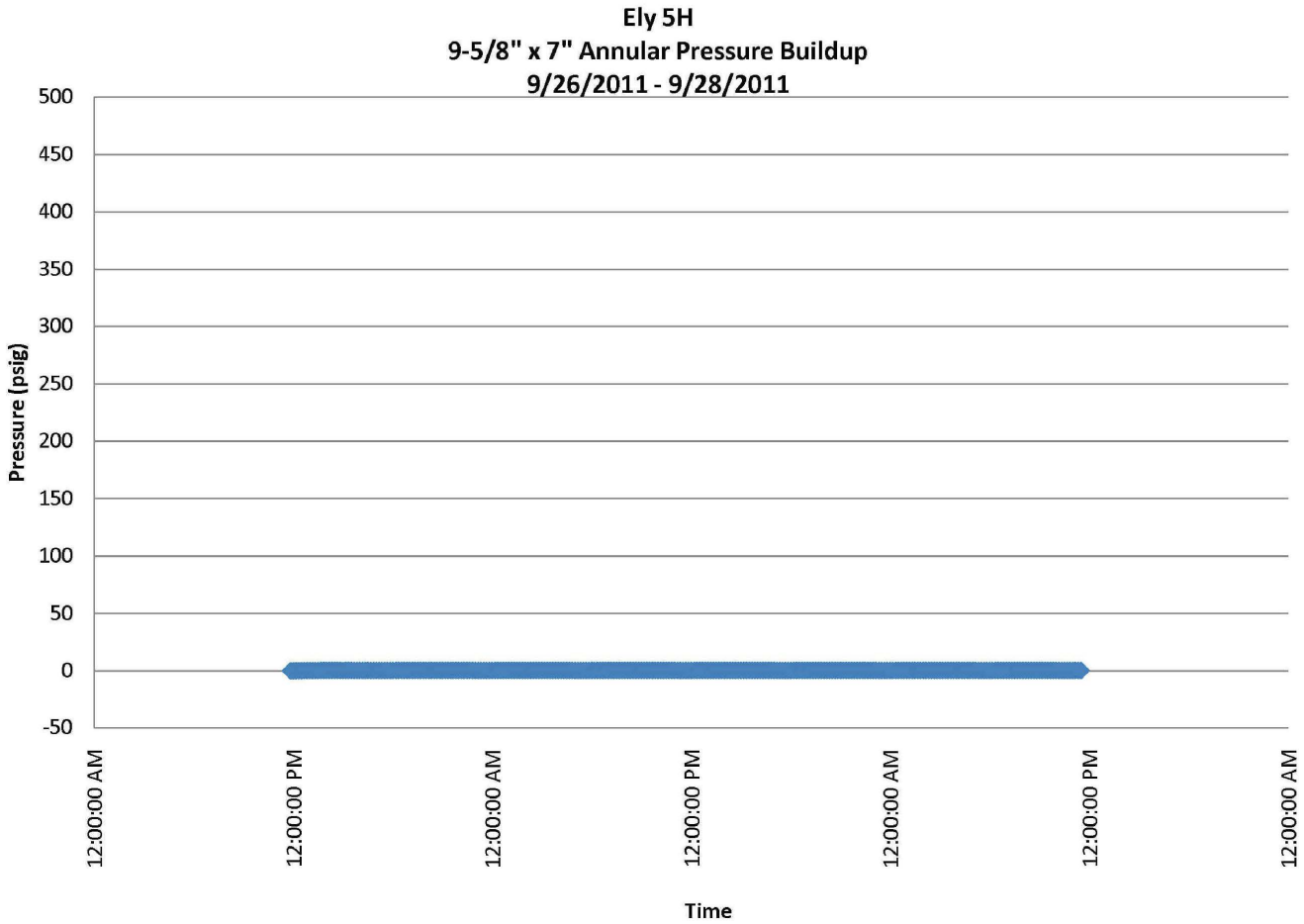


Downhole Tools: Weatherford
Stimulation Co.:

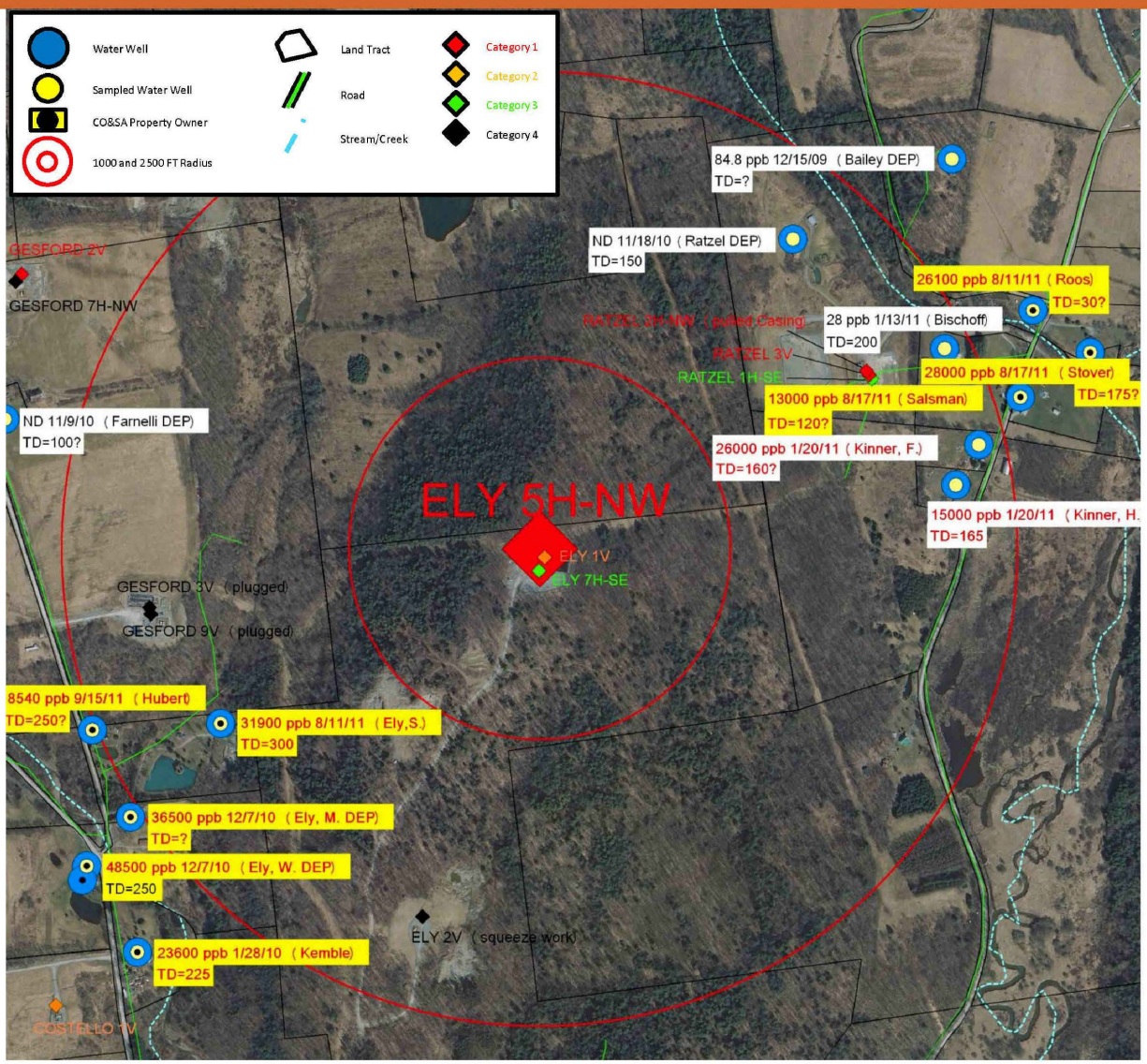
Ely 5H


Ely 5H
7" x 4-1/2" Annular Pressure Buildup
9/26/2011 - 9/28/2011
Pressure (psig)
500
450
400
350
300
250
200
150
100
50
0
-50
12:00:00 AM
12:00:00 PM
12:00:00 AM
12:00:00 PM
12:00:00 AM
12:00:00 PM
12:00:00 AM
Time

Ely 5H


Ely 5H
9-5/8" x 7" Annular Pressure Buildup
9/26/2011 - 9/28/2011
Pressure (psig)
500
450
400
350
300
250
200
150
100
50
0
-50
12:00:00 AM
12:00:00 PM
12:00:00 AM
12:00:00 PM
12:00:00 AM
12:00:00 PM
12:00:00 AM
Time

Ely 5H - NW


Water Well
Sampled Water Well
CO&SA Property Owner
1000 and 2500 FT Radius
Land Tract
Road
Stream/Creek
Category 1
Category 2
Category 3
Category 4
84.8 ppb 12/15/09 (Bailey DEP)
TD=?
ND 11/18/10 (Ratzel DEP)
TD=150
GESFORD 2V
GESFORD 7H-NW
26100 ppb 8/11/11 (Roos)
TD=30?
RATZEL 3H-NW (pulled Casing)
28 ppb 1/13/11 (Bischoff)
TD=200
RATZEL 3V
RATZEL 1H-SE
28000 ppb 8/17/11 (Stover)
TD=175?
13000 ppb 8/17/11 (Salsman)
TD=120?
ND 11/9/10 (Farnelli DEP)
TD=100?
26000 ppb 1/20/11 (Kinner, F.)
TD=160?
ELY 5H-NW
15000 ppb 1/20/11 (Kinner, H.
TD=165
ELY 1V
ELY 7H-SE
GESFORD 3V (plugged)
GESFORD 9V (plugged)
8540 ppb 9/15/11 (Hubert)
TD=250?
31900 ppb 8/11/11 (Ely,S.)
TD=300
36500 ppb 12/7/10 (Ely, M. DEP)
TD=?
48500 ppb 12/7/10 (Ely, W. DEP)
TD=250
ELY 2V (squeeze work)
23600 ppb 1/28/10 (Kemble)
TD=225
COSTELLO 1V

Gesford 2V

Gas Well: Gesford 2V

Category: I

	Size	Depth	TOC	80% FW Gradient
Surface Pipe:	9-5/8	1,036	Surface	359
Intermediate Pipe:	7	1,575	Surface	546
Production:	4-1/2	7,143	1,075	-

	24 Hour		48 Hour	
	11/2010	9/2011	11/2010	9/2011
7 x 9 Annulus				
Pressure PSI:	55	35	78	42
Rate MCFD:	-	0	-	-

	24 Hour		48 Hour	
	11/2010	9/2011	11/2010	9/2011
4 x 7 Annulus:				
Pressure PSI:	0	0	0	0
Rate MCFD:	-	0	-	-

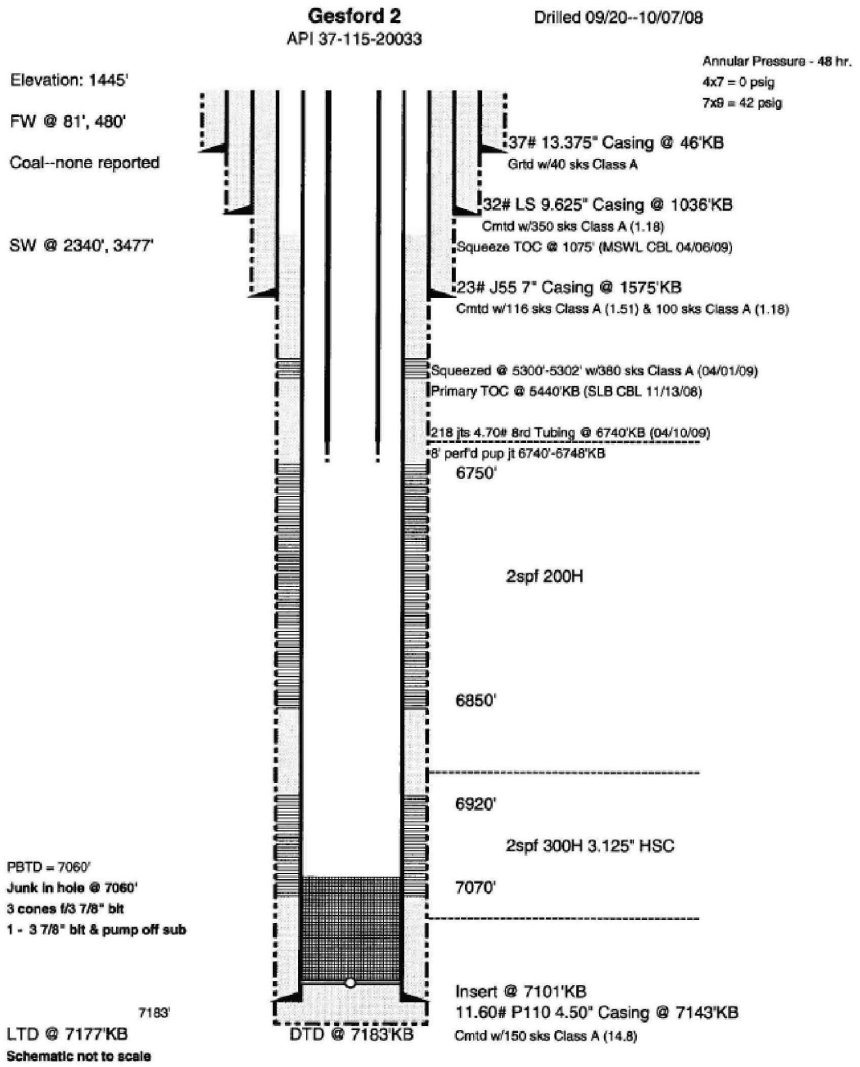
Water wells > 7 MG/L:

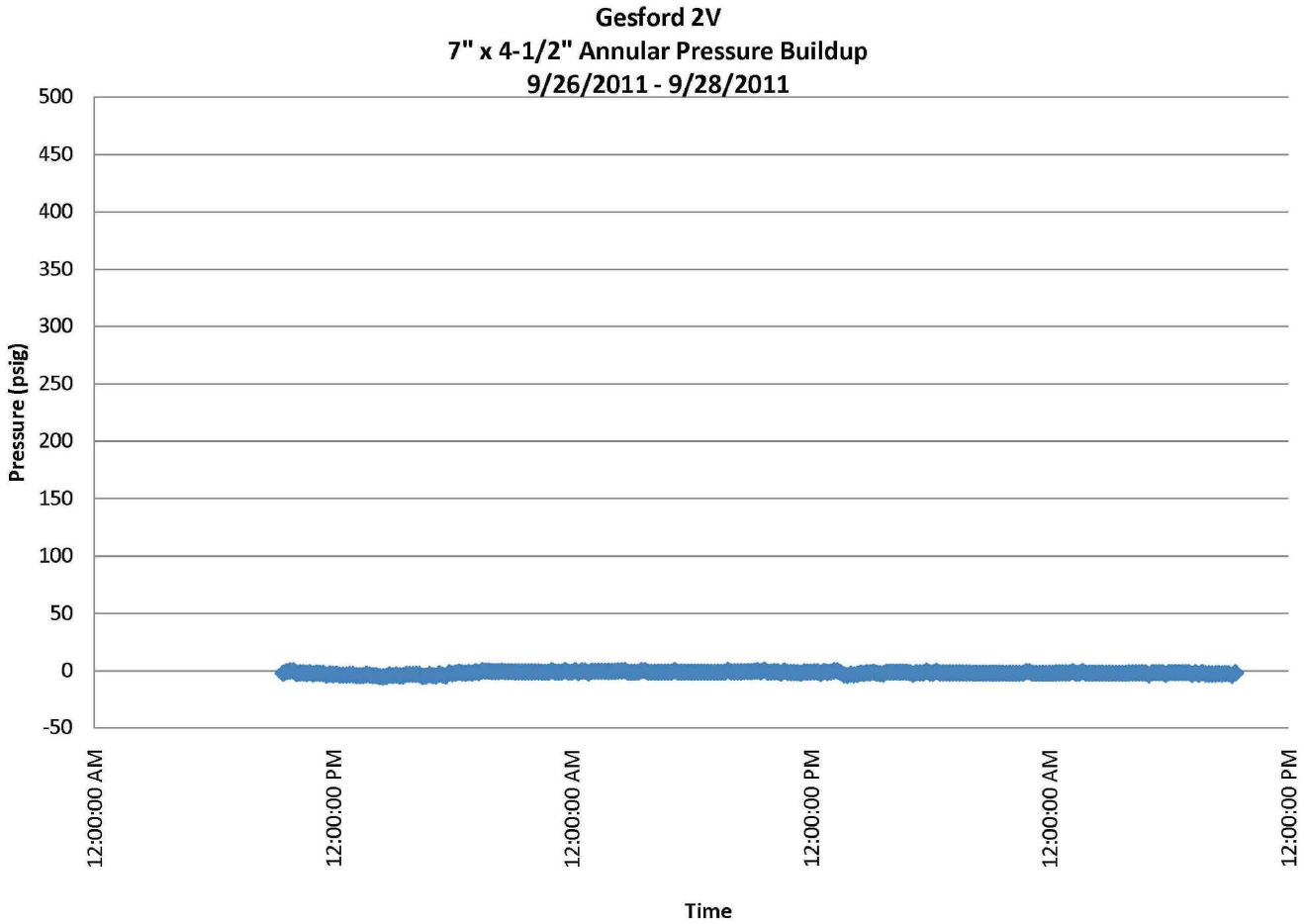
≤ 1000'	None
1000'-2500'	Hubert

Plan Forward: Vent Annulus.

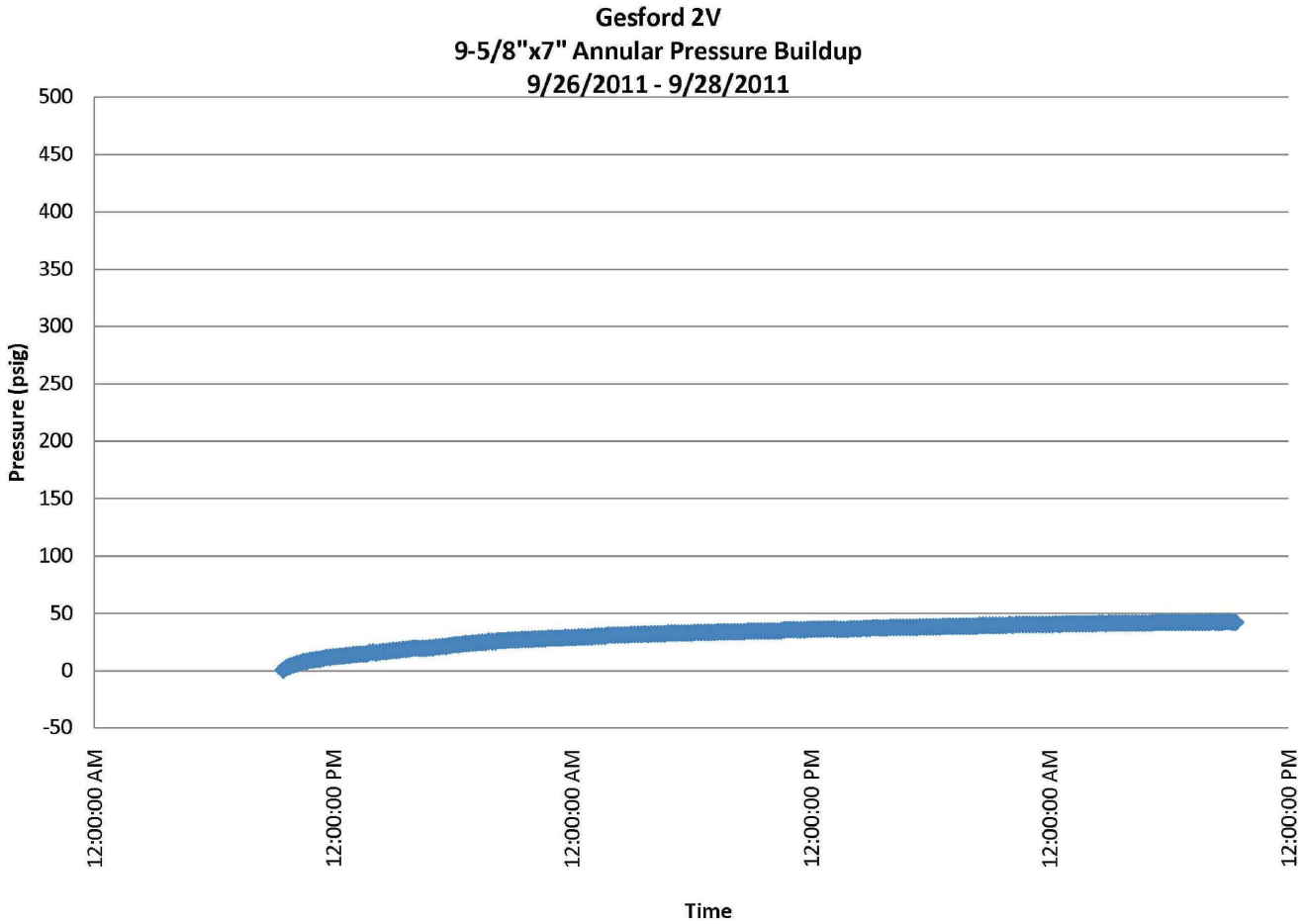
Comments: Squeezed cement in 4-1/2 annulus. 4/1/09
Temp/noise log run. No indication of gas migration. 10/7/11

Gesford 2V

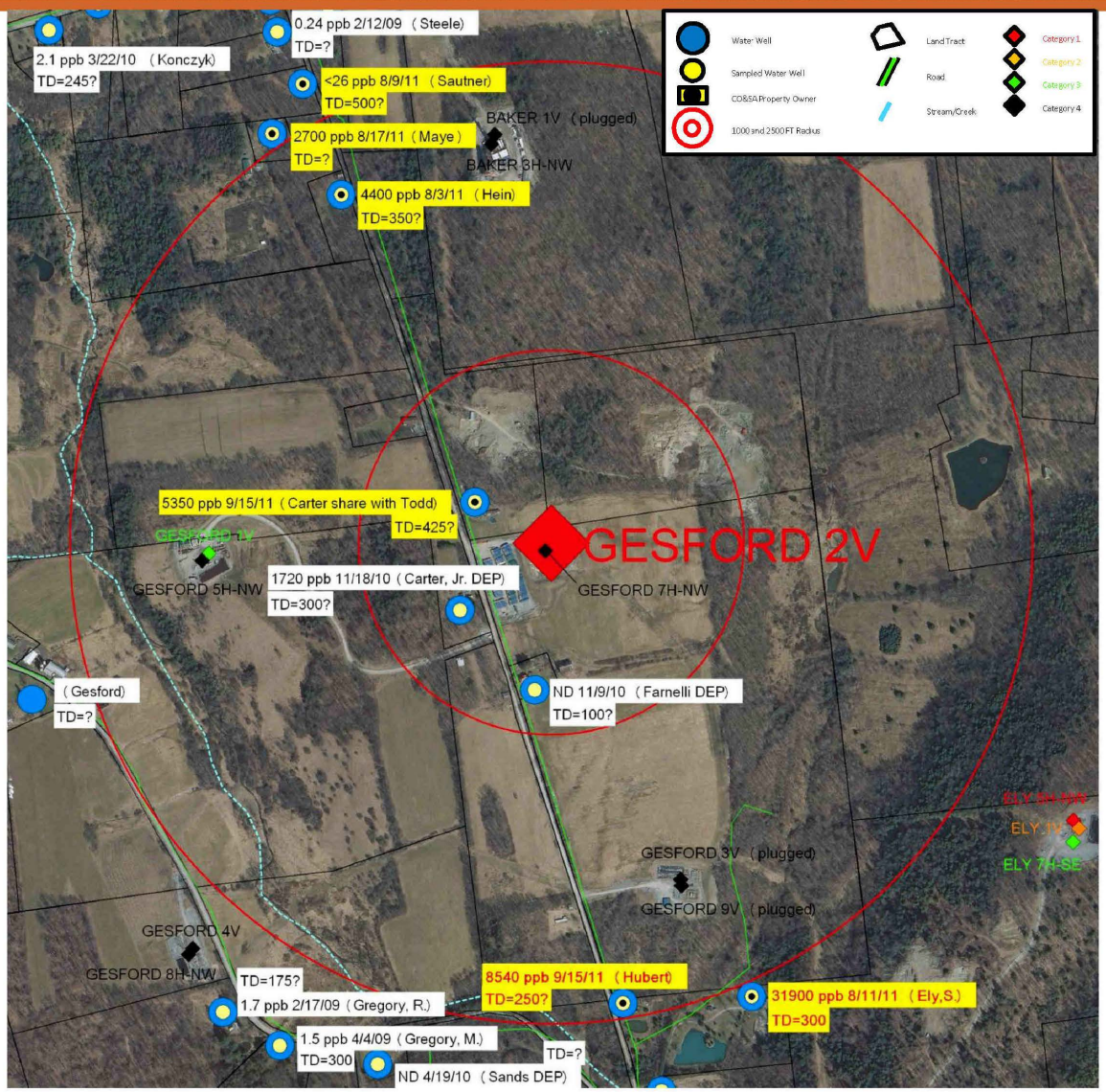

Gesford 2
API 37-115-20033
Drilled 09/20--10/07/08
Annular Pressure - 48 hr.
4x7 = 0 psig
7x9 = 42 psig
Elevation: 1445'
FW @ 81', 480'
Coal--none reported
SW @ 2340', 3477'
37# 13.375" Casing @ 46'KB
Grtd w/40 sks Class A
32# LS 9.625" Casing @ 1036'KB
Cmtd w/350 sks Class A (1.18)
Squeeze TOC @ 1075' (MSWL CBL 04/06/09)
23# J55 7" Casing @ 1575'KB
Cmtd w/116 sks Class A (1.51) & 100 sks Class A (1.18)
Squeezed @ 5300'-5302' w/380 sks Class A (04/01/09)
Primary TOC @ 5440'KB (SLB CBL 11/13/08)
218 jts 4.70# 8rd Tubing @ 6740'KB (04/10/09)
8' perf'd pup jt 6740'-6748'KB
6750'
2spf 200H
6850'
6920'
2spf 300H 3.125" HSC
7070'
PBTD = 7060'
Junk in hole @ 7060'
3 cones f/3 7/8" bit
1 - 3 7/8" bit & pump off sub
7183'
LTD @ 7177'KB
Schematic not to scale
DTD @ 7183'KB
Insert @ 7101'KB
11.60# P110 4.50" Casing @ 7143'KB
Cmtd w/150 sks Class A (14.8)


Gesford 2V
7" x 4-1/2" Annular Pressure Buildup
9/26/2011 - 9/28/2011
Pressure (psig)
500
450
400
350
300
250
200
150
100
50
0
-50
12:00:00 AM
12:00:00 PM
12:00:00 AM
12:00:00 PM
12:00:00 AM
12:00:00 PM
Time

Gesford 2V


Gesford 2V
9-5/8"x7" Annular Pressure Buildup
9/26/2011 - 9/28/2011
Pressure (psig)
500
450
400
350
300
250
200
150
100
50
0
-50
12:00:00 AM
12:00:00 PM
12:00:00 AM
12:00:00 PM
12:00:00 AM
12:00:00 PM
Time

Gesford 2V


Water Well
Sampled Water Well
CO&SA Property Owner
1000 and 2500 FT Radius
Land Tract
Road
Stream/Creek
Category 1
Category 2
Category 3
Category 4
2.1 ppb 3/22/10 (Konczyk)
TD=245?
0.24 ppb 2/12/09 (Steele)
TD=?
<26 ppb 8/9/11 (Sautner)
TD=500?
2700 ppb 8/17/11 (Maye)
TD=?
BAKER 1V (plugged)
BAKER 3H-NW
4400 ppb 8/3/11 (Hein)
TD=350?
5350 ppb 9/15/11 (Carter share with Todd)
TD=425?
GESFORD 2V
GESFORD 5H-NW
1720 ppb 11/18/10 (Carter, Jr. DEP)
TD=300?
GESFORD 7H-NW
(Gesford)
TD=?
ND 11/9/10 (Farnelli DEP)
TD=100?
ELY 7H-SE
GESFORD 3V (plugged)
GESFORD 9V (plugged)
GESFORD 4V
GESFORD 8H-NW
TD=175?
1.7 ppb 2/17/09 (Gregory, R.)
8540 ppb 9/15/11 (Hubert)
TD=250?
31900 ppb 8/11/11 (Ely,S.)
TD=300
1.5 ppb 4/4/09 (Gregory, M.)
TD=300
TD=?
ND 4/19/10 (Sands DEP)

Ratzel 2H

Gas Well: Ratzel 2H

Category: I

	Size	Depth	TOC	80% FW Gradient
Surface Pipe:	9-5/8	844	Surface	292
Intermediate Pipe:	7	1,492	Surface	517
Production:	4-1/2	9,286	2,350	-

	24 Hour		48 Hour	
	11/2010	9/2011	11/2010	9/2011
7 x 9 Annulus				
Pressure PSI:	0	5	4	6
Rate MCFD:	-	0	-	-

	24 Hour		48 Hour	
	11/2010	9/2011	11/2010	9/2011
4 x 7 Annulus:				
Pressure PSI:	210	211	380	299
Rate MCFD:	-	1.3	-	-

Water wells > 7 MG/L:

≤ 1000' Roos, Salsman, F. Kinner, H. Kinner

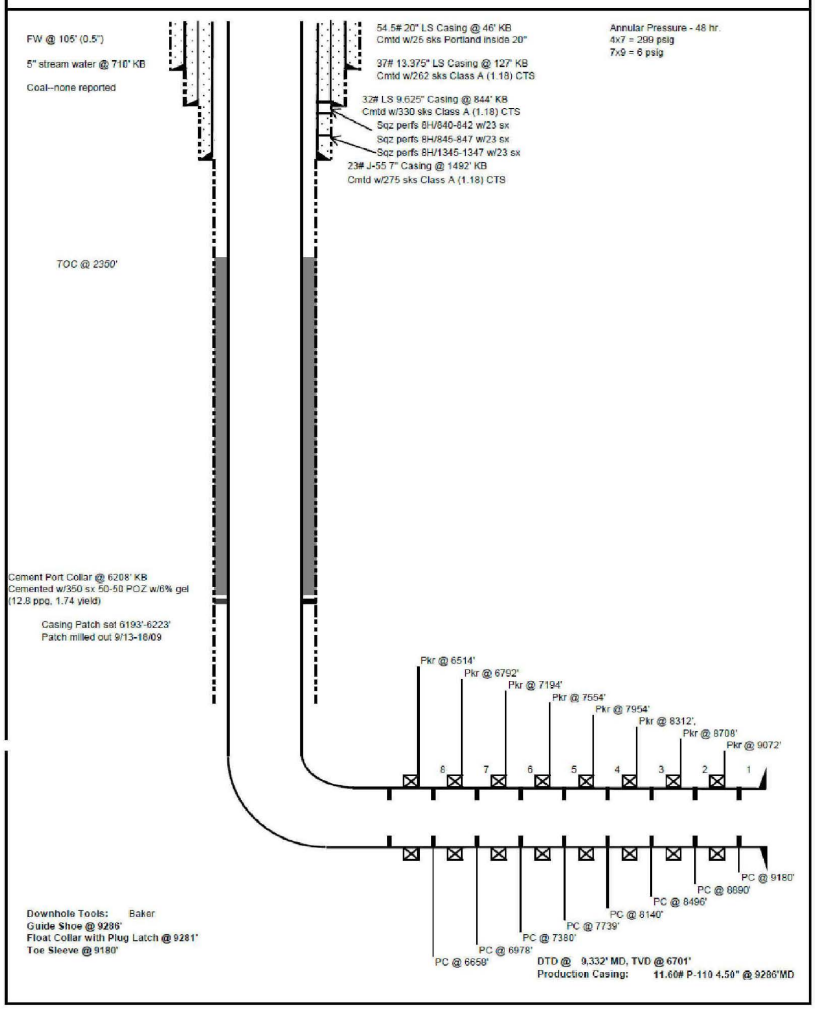
1000'-2500' Stover

Plan Forward: Vent annulus.

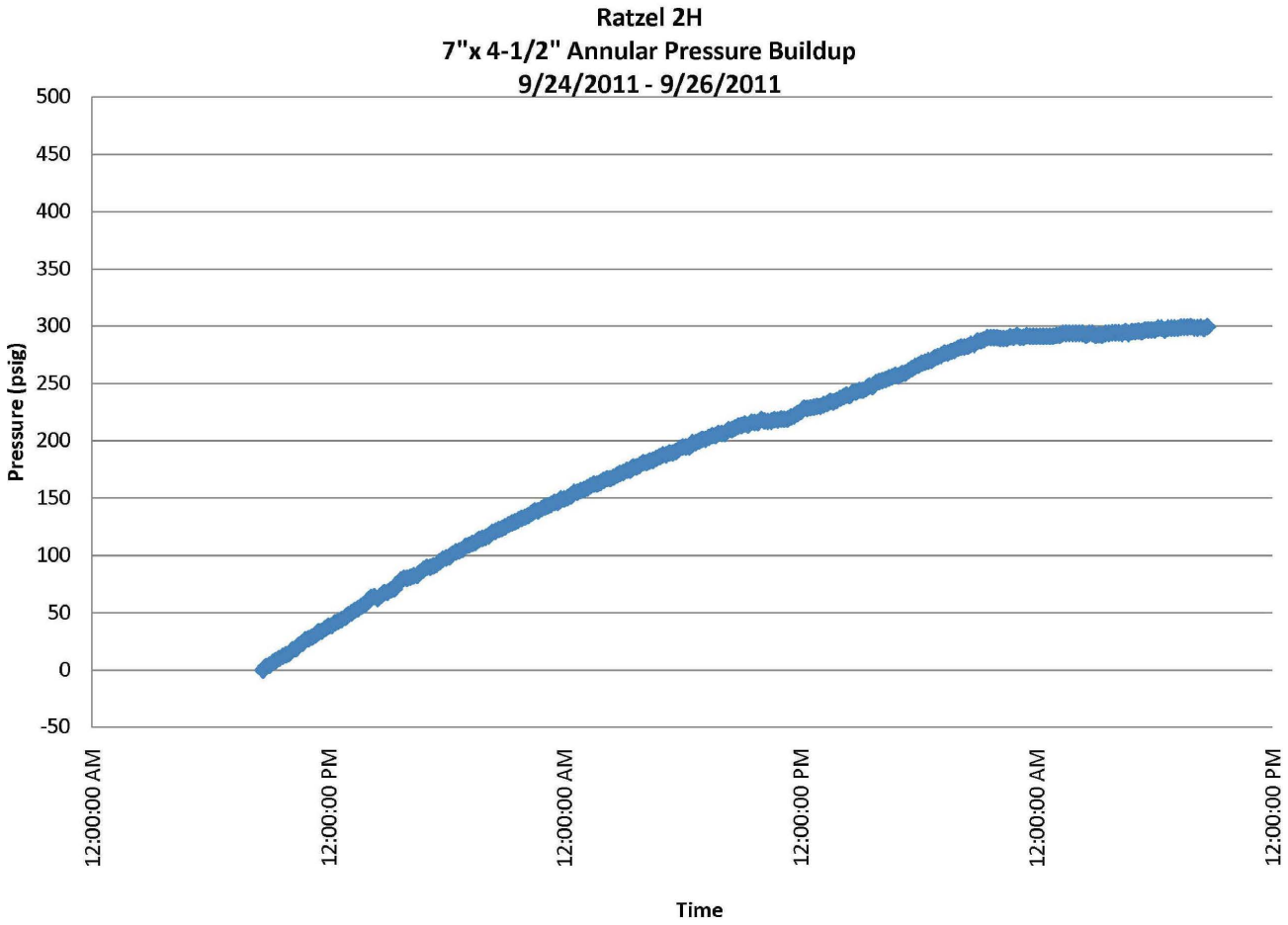
Comments: Temp/Noise log run. No indication of gas migration. 10/4/11
Squeezed cement into 7 x 9 annulus. 9/30 – 10/16/10

Ratzel 2H

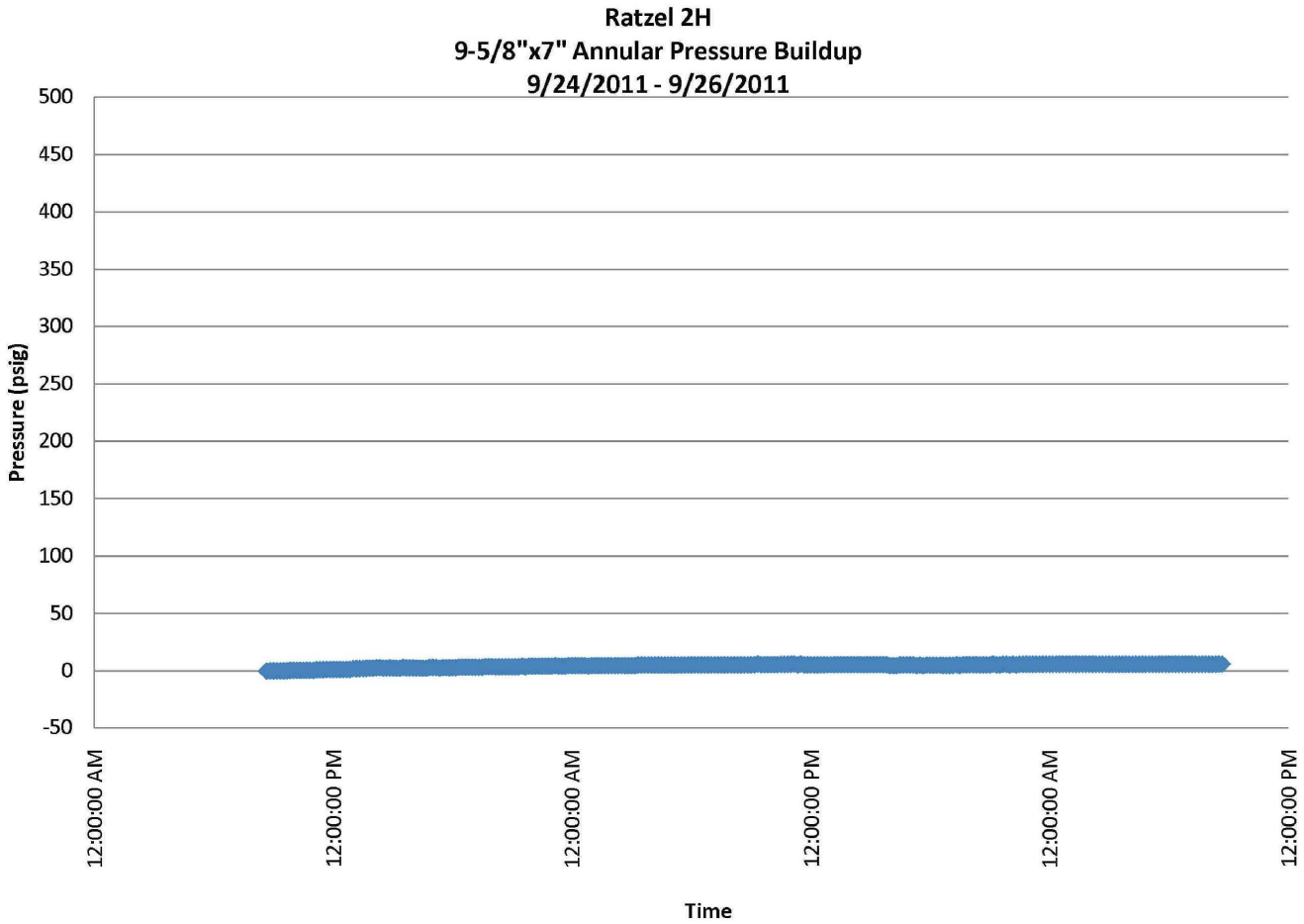
Well Name:	Ratzel 2H	**County, State:**	Susquehanna Co. PA
API Number:	37-115-20152	**TIL Date:**	
AFE Number:		**TIL Rate:**	
Drilling Rig:		**Surf. Latitude:**	
Drilled:	05/18/09 -- 07/13/09	**Surf. Longitude:**	
Completed:		**KB Elevation:**	1435'
Final Open Flow:		**Ground Elevation:**	1425'



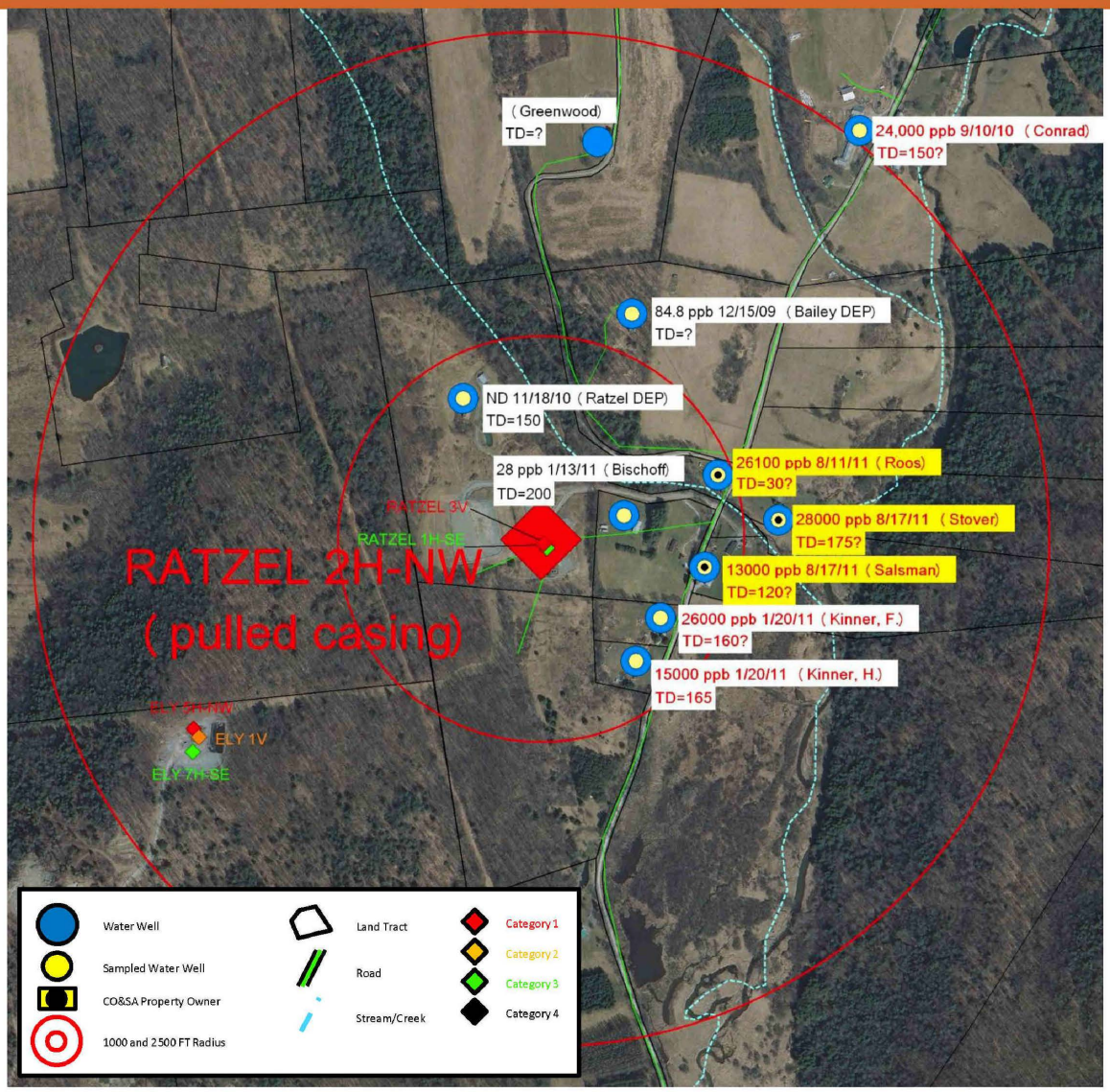
Ratzel 2H


Ratzel 2H
7"x 4-1/2" Annular Pressure Buildup
9/24/2011 - 9/26/2011
Pressure (psig)
500
450
400
350
300
250
200
150
100
50
0
-50
12:00:00 AM
12:00:00 PM
12:00:00 AM
12:00:00 PM
12:00:00 AM
12:00:00 PM
Time

Ratzel 2H


Ratzel 2H
9-5/8"x7" Annular Pressure Buildup
9/24/2011 - 9/26/2011
Pressure (psig)
500
450
400
350
300
250
200
150
100
50
0
-50
12:00:00 AM
12:00:00 PM
12:00:00 AM
12:00:00 PM
12:00:00 AM
12:00:00 PM
Time

Ratzel 2H - NW


(Greenwood)
TD=?
24,000 ppb 9/10/10 (Conrad)
TD=150?
84.8 ppb 12/15/09 (Bailey DEP)
TD=?
ND 11/18/10 (Ratzel DEP)
TD=150
28 ppb 1/13/11 (Bischoff)
TD=200
26100 ppb 8/11/11 (Roos)
TD=30?
28000 ppb 8/17/11 (Stover)
TD=175?
13000 ppb 8/17/11 (Salsman)
TD=120?
26000 ppb 1/20/11 (Kinner, F.)
TD=160?
15000 ppb 1/20/11 (Kinner, H.)
TD=165
RATZEL 3V
RATZEL 1H-SE
RATZEL 2H-NW
(pulled casing)
ELY 1V
ELY 7H-SE
Water Well
Sampled Water Well
CO&SA Property Owner
1000 and 2500 FT Radius
Land Tract
Road
Stream/Creek
Category 1
Category 2
Category 3
Category 4

Ratzel 3V

Gas Well: Ratzel 3V

Category: I

	Size	Depth	TOC	80% FW Gradient
Surface Pipe:	9-5/8	518	Surface	179
Intermediate Pipe:	7	1,494	Surface	518
Production:	4-1/2	6,950	700	-

	24 Hour		48 Hour	
	11/2010	9/2011	11/2010	9/2011
7 x 9 Annulus				
Pressure PSI:	3	0	15	0
Rate MCFD:	-	0	-	-

	24 Hour		48 Hour	
	11/2010	9/2011	11/2010	9/2011
4 x 7 Annulus:				
Pressure PSI:	75	2	100	2
Rate MCFD:	-	0	-	-

Water wells > 7 MG/L:

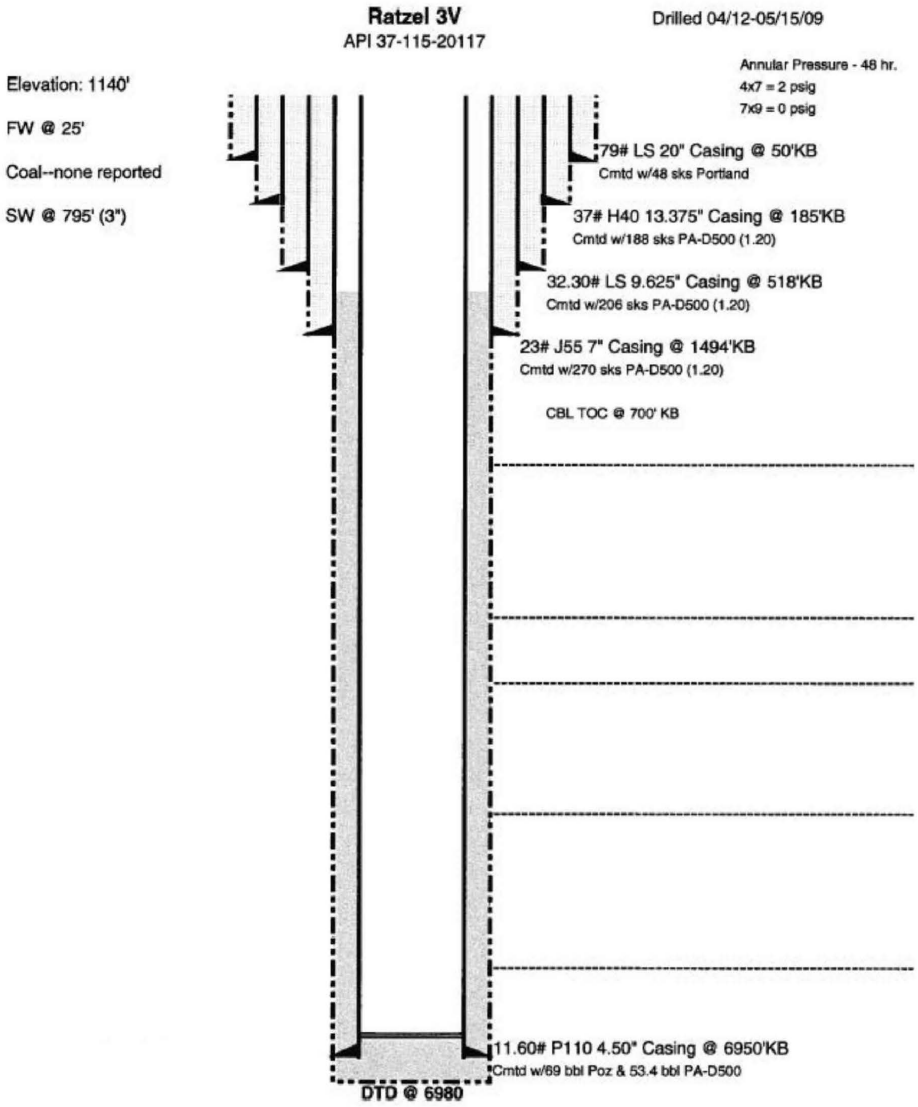
≤ 1000' Roos, Salsman, F. Kinner, H. Kinner

1000'-2500' Stover

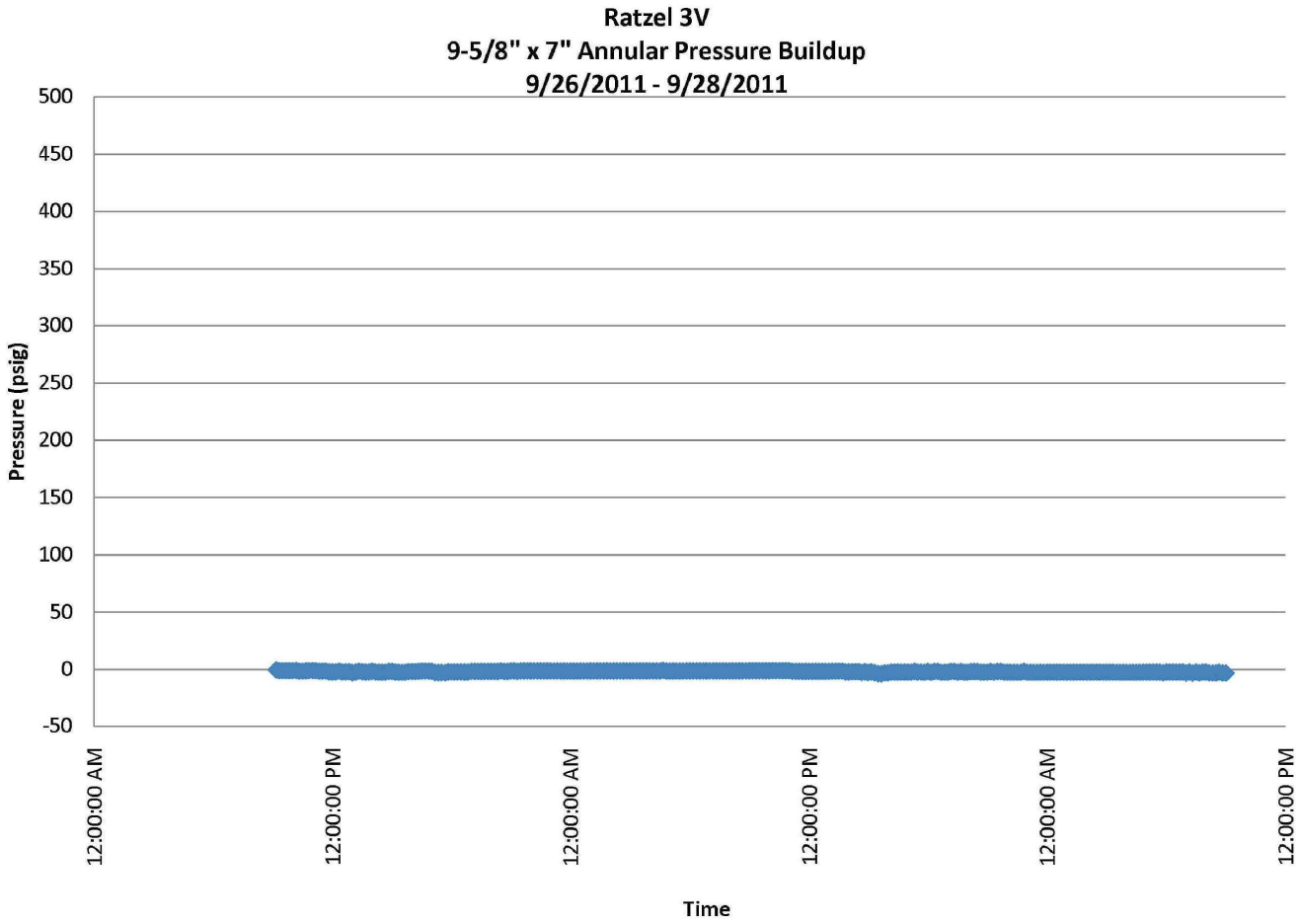
Plan Forward: Vent Annulus

Comments: Temp/noise log run. No indication of gas migration. 10/2/11

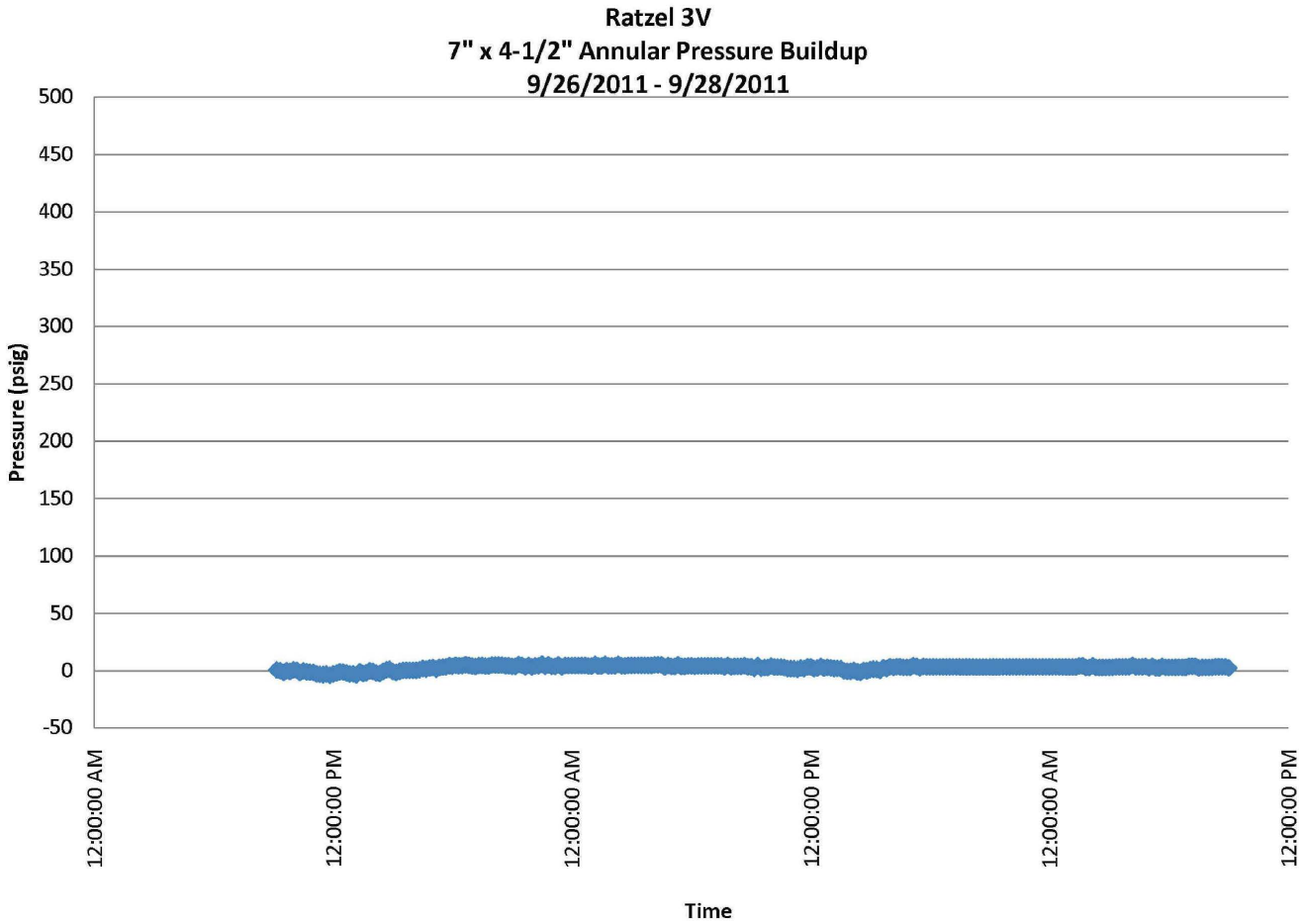
Ratzel 3V


Ratzel 3V
API 37-115-20117
Drilled 04/12-05/15/09
Annular Pressure - 48 hr.
4x7 = 2 psig
7x9 = 0 psig
Elevation: 1140'
FW @ 25'
Coal--none reported
SW @ 795' (3")
79# LS 20" Casing @ 50'KB
Cmtd w/48 sks Portland
37# H40 13.375" Casing @ 185'KB
Cmtd w/188 sks PA-D500 (1.20)
32.30# LS 9.625" Casing @ 518'KB
Cmtd w/206 sks PA-D500 (1.20)
23# J55 7" Casing @ 1494'KB
Cmtd w/270 sks PA-D500 (1.20)
CBL TOC @ 700' KB
11.60# P110 4.50" Casing @ 6950'KB
Cmtd w/69 bbl Poz & 53.4 bbl PA-D500
DTD @ 6980

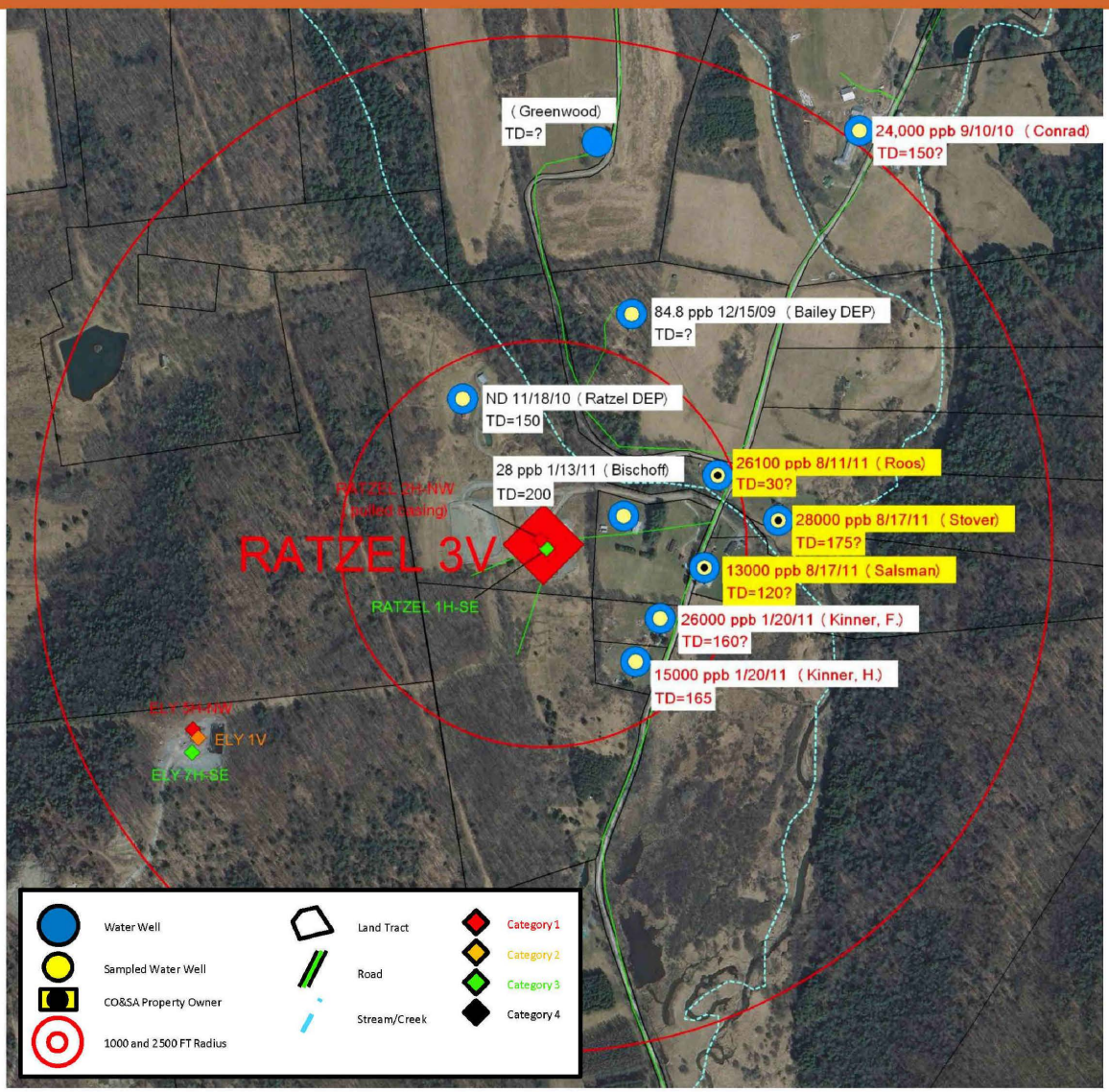
Ratzel 3V


Ratzel 3V
9-5/8" x 7" Annular Pressure Buildup
9/26/2011 - 9/28/2011
Pressure (psig)
500
450
400
350
300
250
200
150
100
50
0
-50
12:00:00 AM
12:00:00 PM
12:00:00 AM
12:00:00 PM
12:00:00 AM
12:00:00 PM
Time

Ratzel 3V


Ratzel 3V
7" x 4-1/2" Annular Pressure Buildup
9/26/2011 - 9/28/2011
Pressure (psig)
500
450
400
350
300
250
200
150
100
50
0
-50
12:00:00 AM
12:00:00 PM
12:00:00 AM
12:00:00 PM
12:00:00 AM
12:00:00 PM
Time

Ratzel 3V


(Greenwood)
TD=?
24,000 ppb 9/10/10 (Conrad)
TD=150?
84.8 ppb 12/15/09 (Bailey DEP)
TD=?
ND 11/18/10 (Ratzel DEP)
TD=150
28 ppb 1/13/11 (Bischoff)
TD=200
26100 ppb 8/11/11 (Roos)
TD=30?
28000 ppb 8/17/11 (Stover)
TD=175?
13000 ppb 8/17/11 (Salsman)
TD=120?
26000 ppb 1/20/11 (Kinner, F.)
TD=160?
15000 ppb 1/20/11 (Kinner, H.)
TD=165
RATZEL 3H-NW
(kulled casing)
RATZEL 3V
RATZEL 1H-SE
ELY 3H-NW
ELY 1V
ELY 7H-SE
Water Well
Sampled Water Well
CO&SA Property Owner
1000 and 2500 FT Radius
Land Tract
Road
Stream/Creek
Category 1
Category 2
Category 3
Category 4

Remediation History – Category I

Well Name	Remediation History
Brooks 1H	None.
Ely 4V	Squeeze cement in 4-1/2 annulus. (5,750'-1,166') w/ 450 Sx – 3/16/2009. (1,500'-1,502') w/ 23 Sx – 5/11/2010.
Ely 5H	Temp/Noise log run. No indication of gas migration – 10/1/2011 .
Gesford 2V	Squeezed cement in 4-1/2 annulus (5,302'-1,075) w/ 380 Sx – 4/1/2009. Temp/noise log run. No indication of gas migration – 10/7/2011 .
Ratzel 2H	Temp/Noise log run. No indication of gas migration – 10/4/2011. Squeezed cement into 7 x 9 annulus. (840'-840') w/ 23 Sx, (845'-847') w/ 23 Sx – 9/30/2010 – 10/16/2010. (1,345'-1,347') w/ 23 Sx – 9/30/2010 – 10/16/2010.
Ratzel 3V	Temp/noise log run. No indication of gas migration – 10/2/2011.

Summary – Category I

Well Name	Comments	Action Taken	Action Plan
Brooks 1H	Annular pressure increased	Vent Annulus	Cement Squeeze
Ely 4V	Annular pressure zero	Vent Annulus	None
Ely 5H	7x9 – 1 psi, 4x7 – 0 psi Temp/noise log shows no gas migration	Vent Annulus	None
Gesford 2	Annular pressure decreased Temp/noise log shows no gas migration	Vent Annulus	None
Ratzel 2H	Temp/noise log shows no gas migration	Vent Annulus	None
Ratzel 3V	7x9 – 0 psi, 4x7 – 2 psi Temp/noise log shows no gas migration	Vent Annulus	None

Category: II

Gas present in the annular space between the production and the intermediate or surface casing.

Category II (8 wells)

- 6 wells - annular pressure decrease or flat
- 1 well – minor annular pressure increase (to 6 psi)
- 1 well – annular pressure increase (21 psi)

Costello 1V

Gas Well: Costello 1V

Category: II

	Size	Depth	TOC	80% FW Gradient
Surface Pipe:	9-5/8	727	Surface	252
Intermediate Pipe:	7	1,566	Surface	542
Production:	4-1/2	6,990	1,450	-

	24 Hour		48 Hour	
7 x 9 Annulus				
Pressure PSI:	-	-	-	-
Rate MCFD:	-	-	-	-

	24 Hour		48 Hour	
	11/2010	10/2011	11/2010	10/2011
4 x 7 Annulus:				
Pressure PSI:	2	23	2	23
Rate MCFD:	-	0	-	-

Water wells > 7 MG/L:

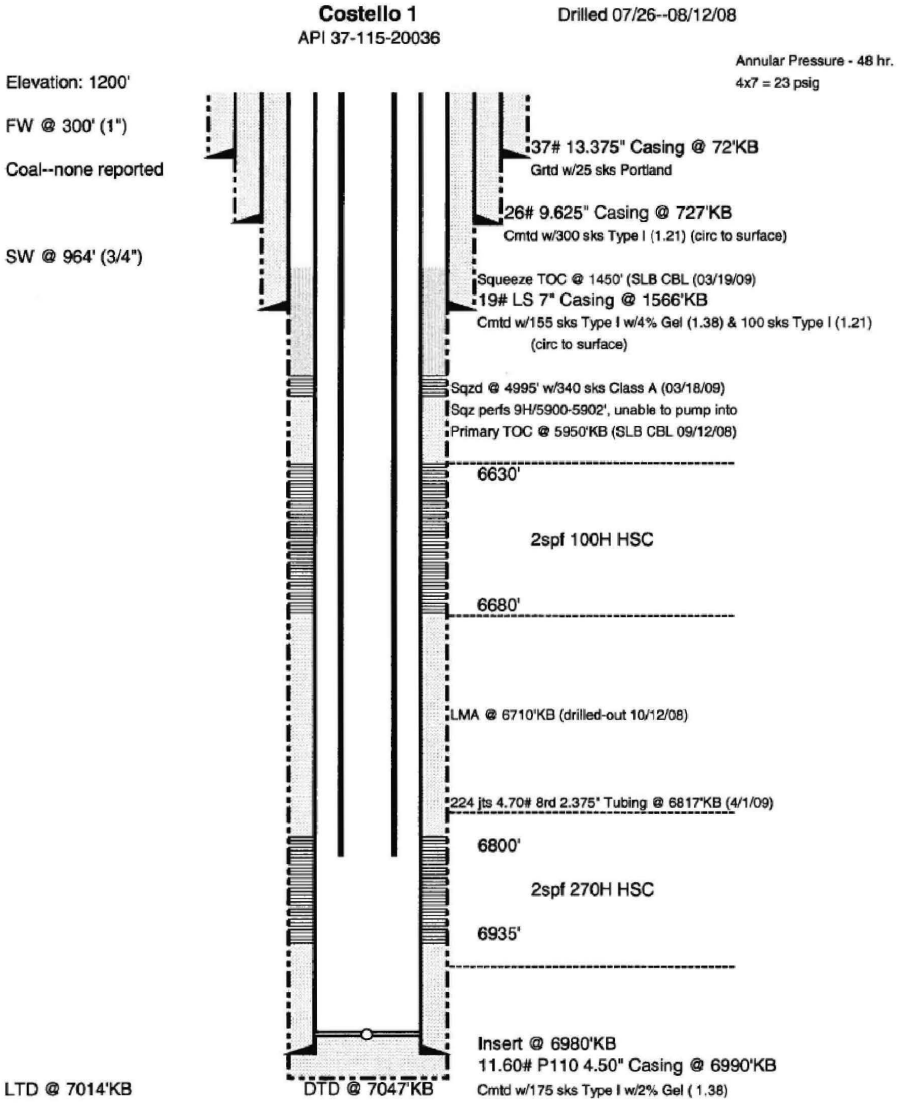
≤ 1000' W. Ely, Kemble

1000'-2500' M. Ely, S. Ely, Hubert

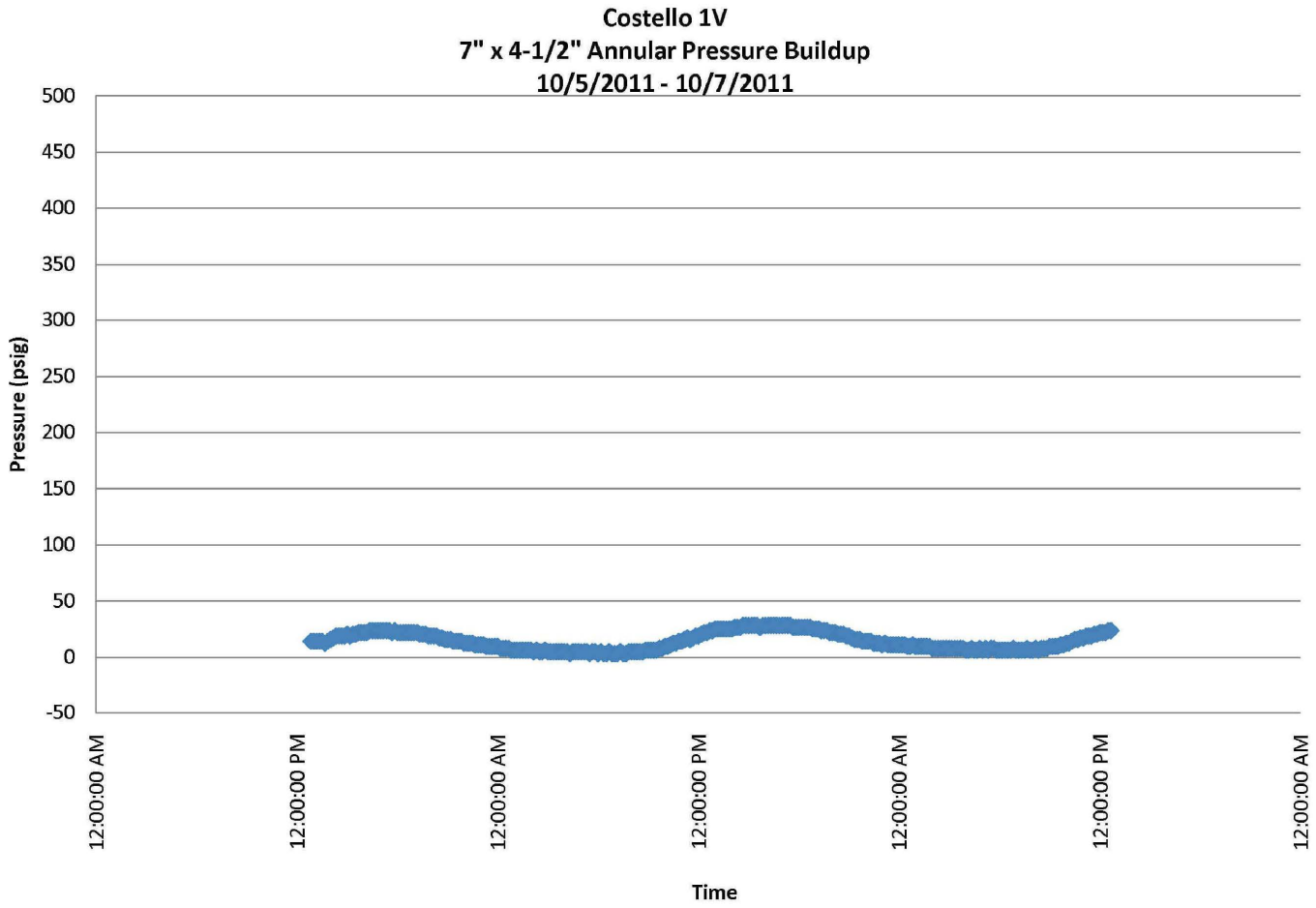
Plan Forward: Vent Annulus.

Comments: Squeezed cement in 4-1/2 annulus. 3/18/2009
Temp/noise log run. No indications of gas migration 10/14/11.

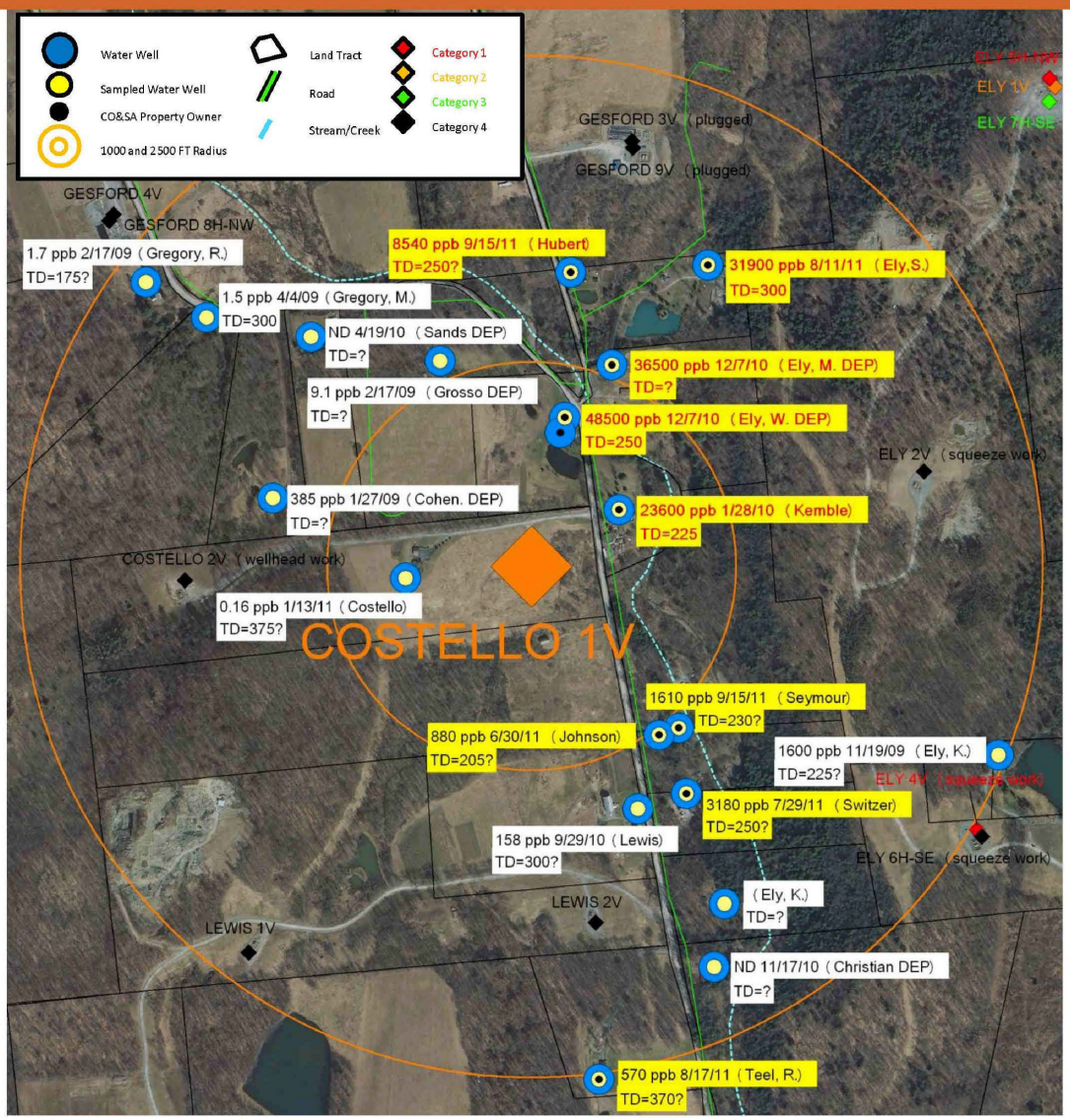
Costello 1V


Costello 1
API 37-115-20036
Drilled 07/26--08/12/08
Annular Pressure - 48 hr.
4x7 = 23 psig
Elevation: 1200'
FW @ 300' (1")
Coal--none reported
SW @ 964' (3/4")
37# 13.375" Casing @ 72'KB
Grtd w/25 sks Portland
26# 9.625" Casing @ 727'KB
Cmtd w/300 sks Type I (1.21) (circ to surface)
Squeeze TOC @ 1450' (SLB CBL (03/19/09)
19# LS 7" Casing @ 1566'KB
Cmtd w/155 sks Type I w/4% Gel (1.38) & 100 sks Type I (1.21)
(circ to surface)
Sqzd @ 4995' w/340 sks Class A (03/18/09)
Sqz perfs 9H/5900-5902', unable to pump into
Primary TOC @ 5950'KB (SLB CBL 09/12/08)
6630'
2spf 100H HSC
6680'
LMA @ 6710'KB (drilled-out 10/12/08)
224 jts 4.70# 8rd 2.375" Tubing @ 6817'KB (4/1/09)
6800'
2spf 270H HSC
6935'
Insert @ 6980'KB
11.60# P110 4.50" Casing @ 6990'KB
Cmtd w/175 sks Type I w/2% Gel (1.38)
LTD @ 7014'KB
DTD @ 7047'KB

Costello 1V


Costello 1V
7" x 4-1/2" Annular Pressure Buildup
10/5/2011 - 10/7/2011
Pressure (psig)
500
450
400
350
300
250
200
150
100
50
0
-50
12:00:00 AM
12:00:00 PM
12:00:00 AM
12:00:00 PM
12:00:00 AM
12:00:00 PM
12:00:00 AM
Time

Costello 1V


Water Well
Sampled Water Well
CO&SA Property Owner
1000 and 2500 FT Radius
Land Tract
Road
Stream/Creek
Category 1
Category 2
Category 3
Category 4
ELY 1V
ELY 7H-SE
GESFORD 3V (plugged)
GESFORD 9V (plugged)
GESFORD 4V
GESFORD 8H-NW
1.7 ppb 2/17/09 (Gregory, R.)
TD=175?
8540 ppb 9/15/11 (Hubert)
TD=250?
31900 ppb 8/11/11 (Ely,S.)
TD=300
1.5 ppb 4/4/09 (Gregory, M.)
TD=300
ND 4/19/10 (Sands DEP)
TD=?
36500 ppb 12/7/10 (Ely, M. DEP)
TD=?
9.1 ppb 2/17/09 (Grosso DEP)
TD=?
48500 ppb 12/7/10 (Ely, W. DEP)
TD=250
ELY 2V (squeeze work)
385 ppb 1/27/09 (Cohen. DEP)
TD=?
23600 ppb 1/28/10 (Kemble)
TD=225
COSTELLO 2V (wellhead work)
0.16 ppb 1/13/11 (Costello)
TD=375?
COSTELLO 1V
1610 ppb 9/15/11 (Seymour)
TD=230?
880 ppb 6/30/11 (Johnson)
TD=205?
1600 ppb 11/19/09 (Ely, K.)
TD=225?
3180 ppb 7/29/11 (Switzer)
TD=250?
158 ppb 9/29/10 (Lewis)
TD=300?
ELY 6H-SE (squeeze work)
(Ely, K.)
TD=?
LEWIS 2V
LEWIS 1V
ND 11/17/10 (Christian DEP)
TD=?
570 ppb 8/17/11 (Teel, R.)
TD=370?

Ely 1H

Gas Well: Ely 1H

Category: II

	Size	Depth	TOC	80% FW Gradient
Surface Pipe:	9-5/8	1,120	Surface	388
Intermediate Pipe:	7	1,556	Surface	539
Production:	4-1/2	7,368	Surface	-

	24 Hour		48 Hour	
	12/2010	9/2011	12/2010	9/2011
7 x 9 Annulus				
Pressure PSI:	0	1	0	2
Rate MCFD:	-	0	-	-

	24 Hour		48 Hour	
	12/2010	9/2011	12/2010	9/2011
4 x 7 Annulus:				
Pressure PSI:	235	164	325	208
Rate MCFD:	-	0	-	-

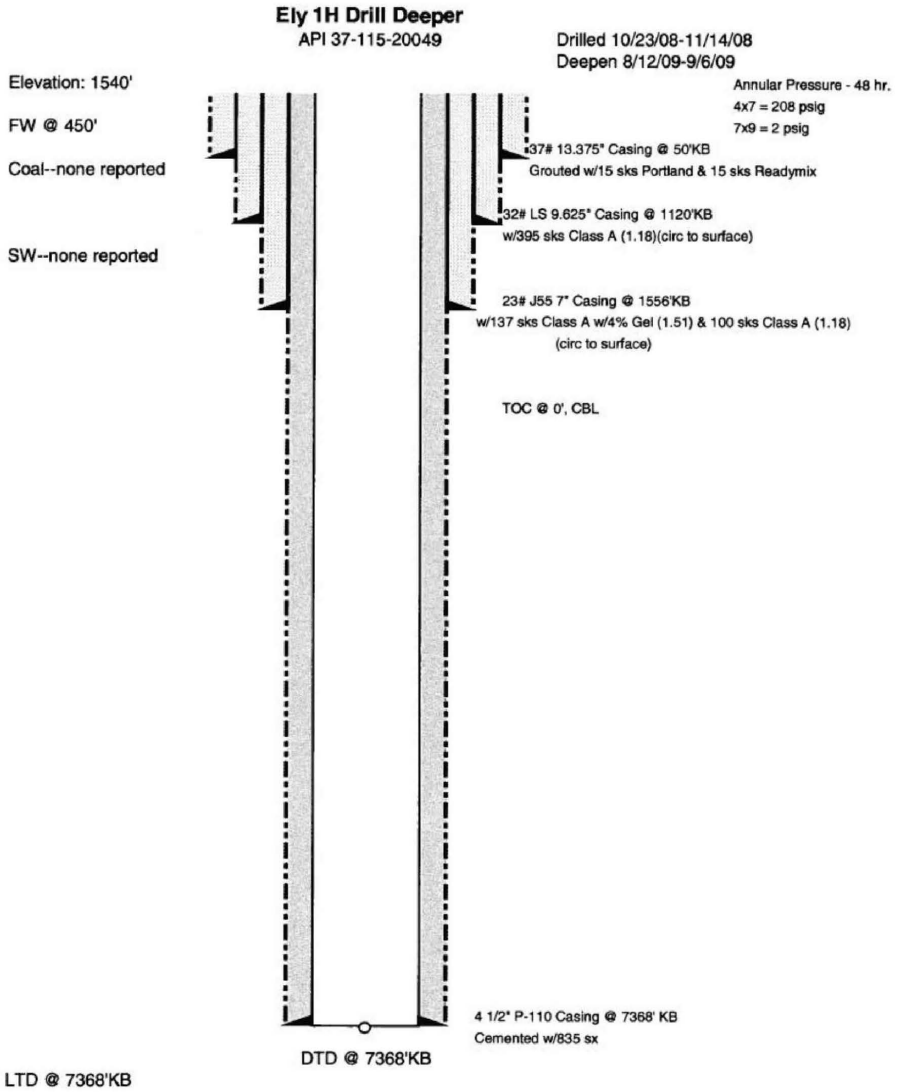
Water wells > 7 MG/L:

≤ 1000'	None
1000'-2500'	F. Kinner, H. Kinner, S. Ely

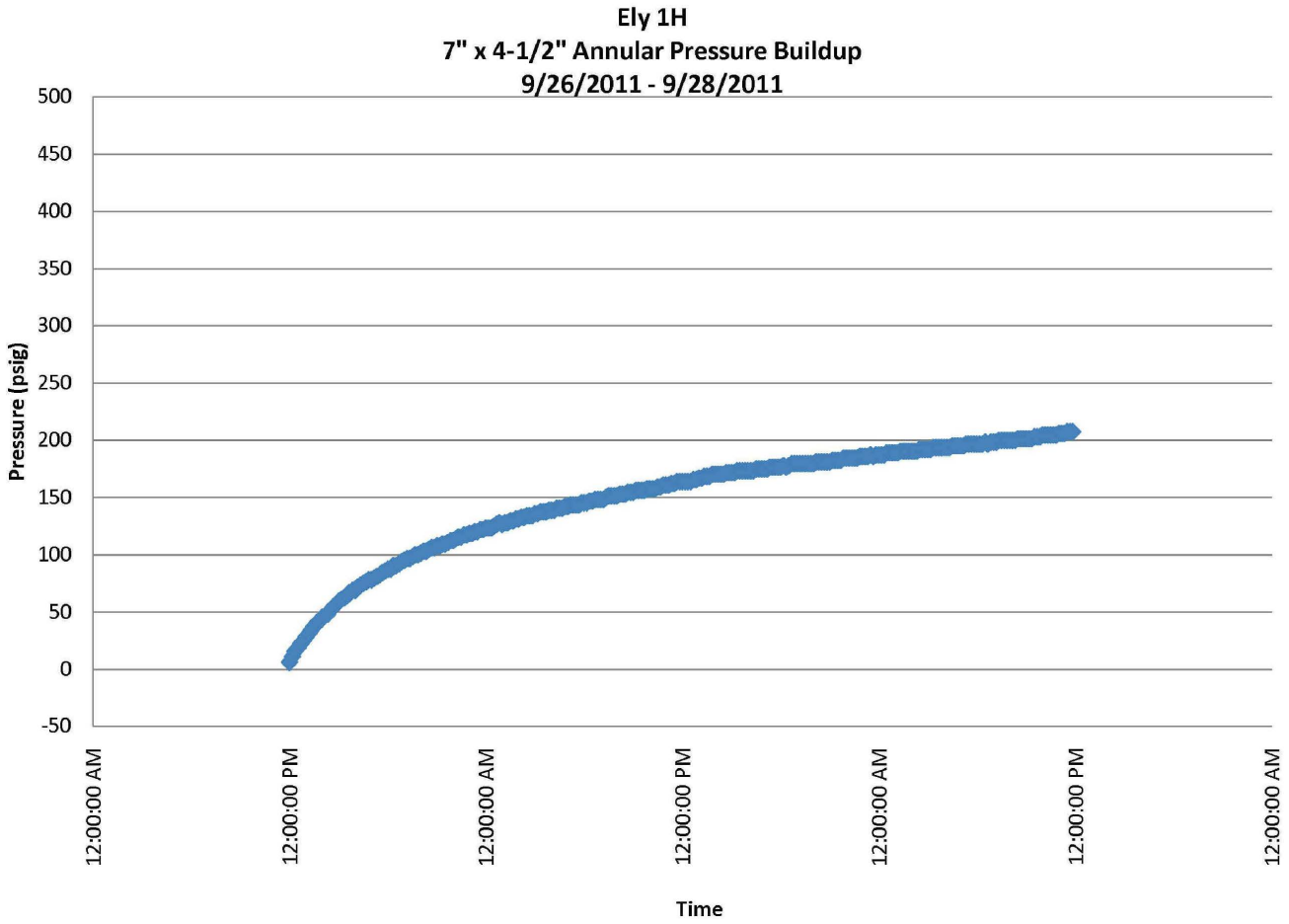
Plan Forward: Vent Annulus

Comments: Well is not completed.

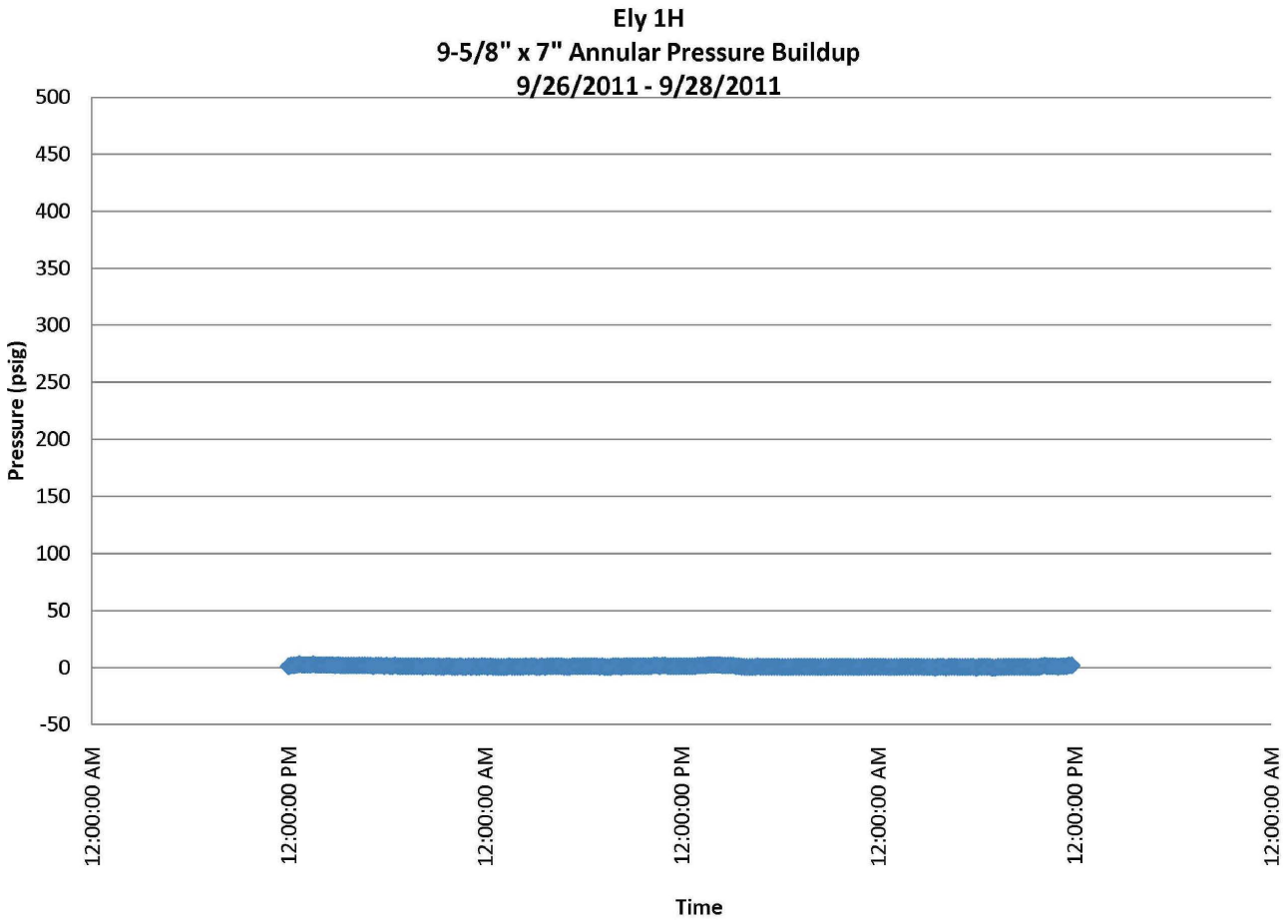
Ely 1H


Ely 1H Drill Deeper
API 37-115-20049
Drilled 10/23/08-11/14/08
Deepen 8/12/09-9/6/09
Elevation: 1540'
FW @ 450'
Coal--none reported
SW--none reported
Annular Pressure - 48 hr.
4x7 = 208 psig
7x9 = 2 psig
37# 13.375" Casing @ 50'KB
Grouted w/15 sks Portland & 15 sks Readymix
32# LS 9.625" Casing @ 1120'KB
w/395 sks Class A (1.18)(circ to surface)
23# J55 7" Casing @ 1556'KB
w/137 sks Class A w/4% Gel (1.51) & 100 sks Class A (1.18)
(circ to surface)
TOC @ 0', CBL
4 1/2" P-110 Casing @ 7368' KB
Cemented w/835 sx
DTD @ 7368'KB
LTD @ 7368'KB

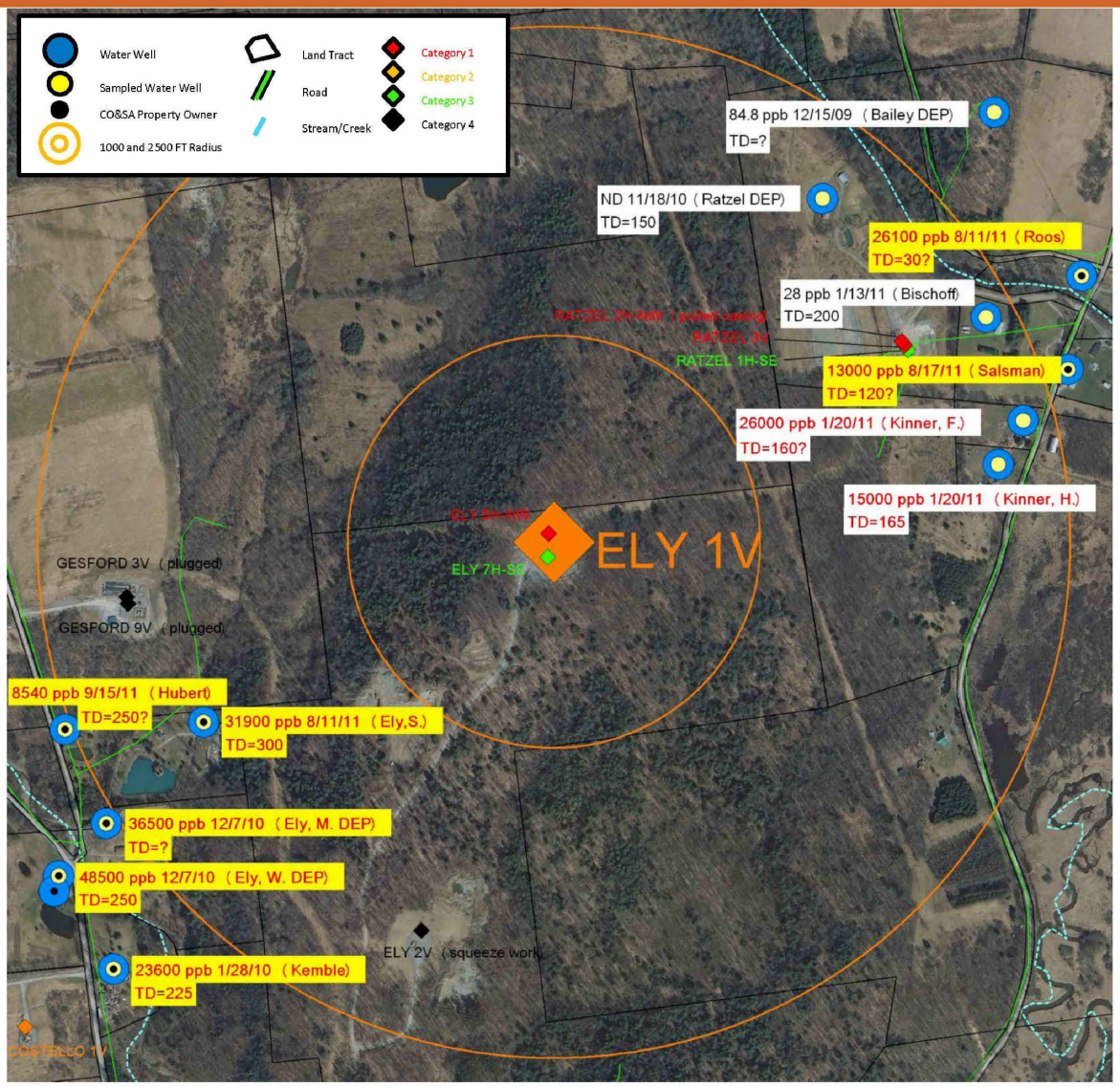
Ely 1H


Ely 1H
7" x 4-1/2" Annular Pressure Buildup
9/26/2011 - 9/28/2011
Pressure (psig)
500
450
400
350
300
250
200
150
100
50
0
-50
12:00:00 AM
12:00:00 PM
12:00:00 AM
12:00:00 PM
12:00:00 AM
12:00:00 PM
12:00:00 AM
Time

Ely 1H


Ely 1H
9-5/8" x 7" Annular Pressure Buildup
9/26/2011 - 9/28/2011
Pressure (psig)
500
450
400
350
300
250
200
150
100
50
0
-50
12:00:00 AM
12:00:00 PM
12:00:00 AM
12:00:00 PM
12:00:00 AM
12:00:00 PM
12:00:00 AM
Time

Ely 1H


Water Well
Sampled Water Well
CO&SA Property Owner
1000 and 2500 FT Radius
Land Tract
Road
Stream/Creek
Category 1
Category 2
Category 3
Category 4
84.8 ppb 12/15/09 (Bailey DEP)
TD=?
ND 11/18/10 (Ratzel DEP)
TD=150
26100 ppb 8/11/11 (Roos)
TD=30?
28 ppb 1/13/11 (Bischoff)
TD=200
RATZEL 2H-NW (pulled casing)
RATZEL 3H
RATZEL 1H-SE
13000 ppb 8/17/11 (Salsman)
TD=120?
26000 ppb 1/20/11 (Kinner, F.)
TD=160?
15000 ppb 1/20/11 (Kinner, H.)
TD=165
ELY 8H-NW
ELY 7H-SE
ELY 1V
GESFORD 3V (plugged)
GESFORD 9V (plugged)
8540 ppb 9/15/11 (Hubert)
TD=250?
31900 ppb 8/11/11 (Ely,S.)
TD=300
36500 ppb 12/7/10 (Ely, M. DEP)
TD=?
48500 ppb 12/7/10 (Ely, W. DEP)
TD=250
ELY 2V (squeeze work)
23600 ppb 1/28/10 (Kemble)
TD=225
COSTELLO 1V

Grimsley 1V

Gas Well: Grimsley, J. 1V

Category: II

	Size	Depth	TOC	80% FW Gradient
Surface Pipe:	9-5/8	1,463	Surface	507
Intermediate Pipe:	None	-	-	-
Production:	5-1/2	7,388	1,100	-

	24 Hour		48 Hour	
7 x 9 Annulus				
Pressure PSI:	None	-	-	-
Rate MCFD:	-	-	-	-

	24 Hour		48 Hour	
	12/2010	9/2011	12/2010	9/2011
5 x 9 Annulus:				
Pressure PSI:	70	1	70	1
Rate MCFD:	-	0	-	-

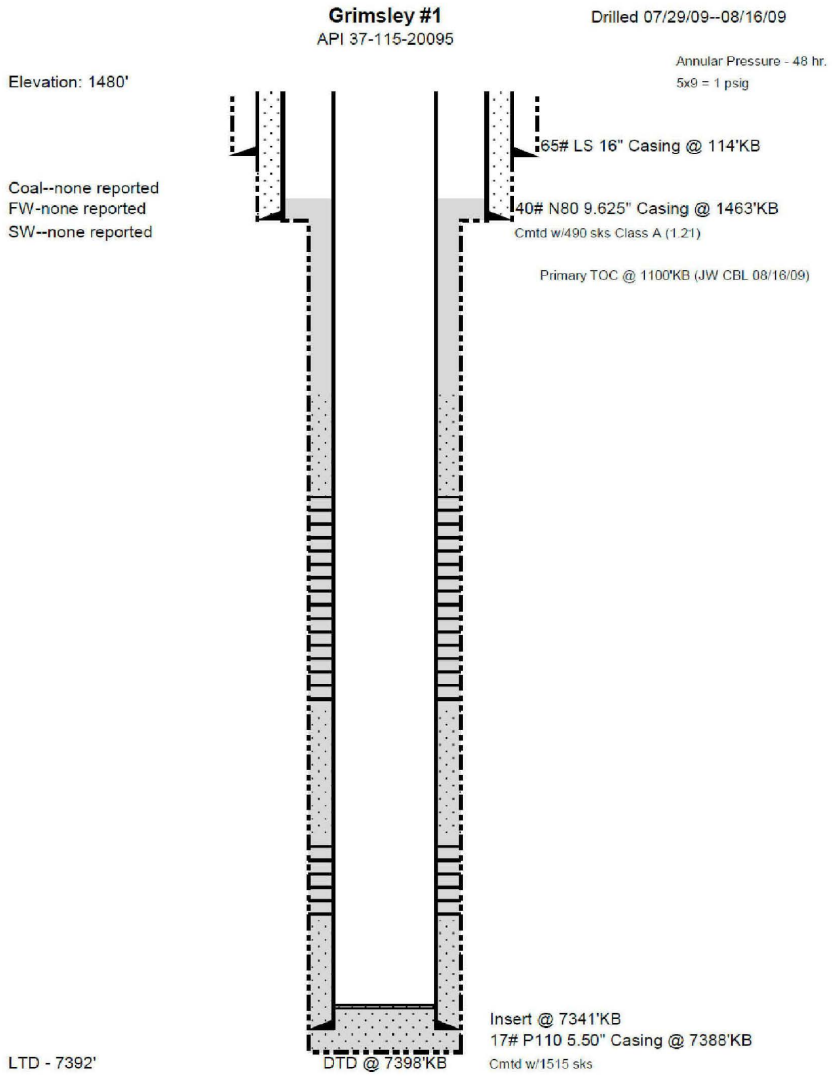
Water wells > 7 MG/L:

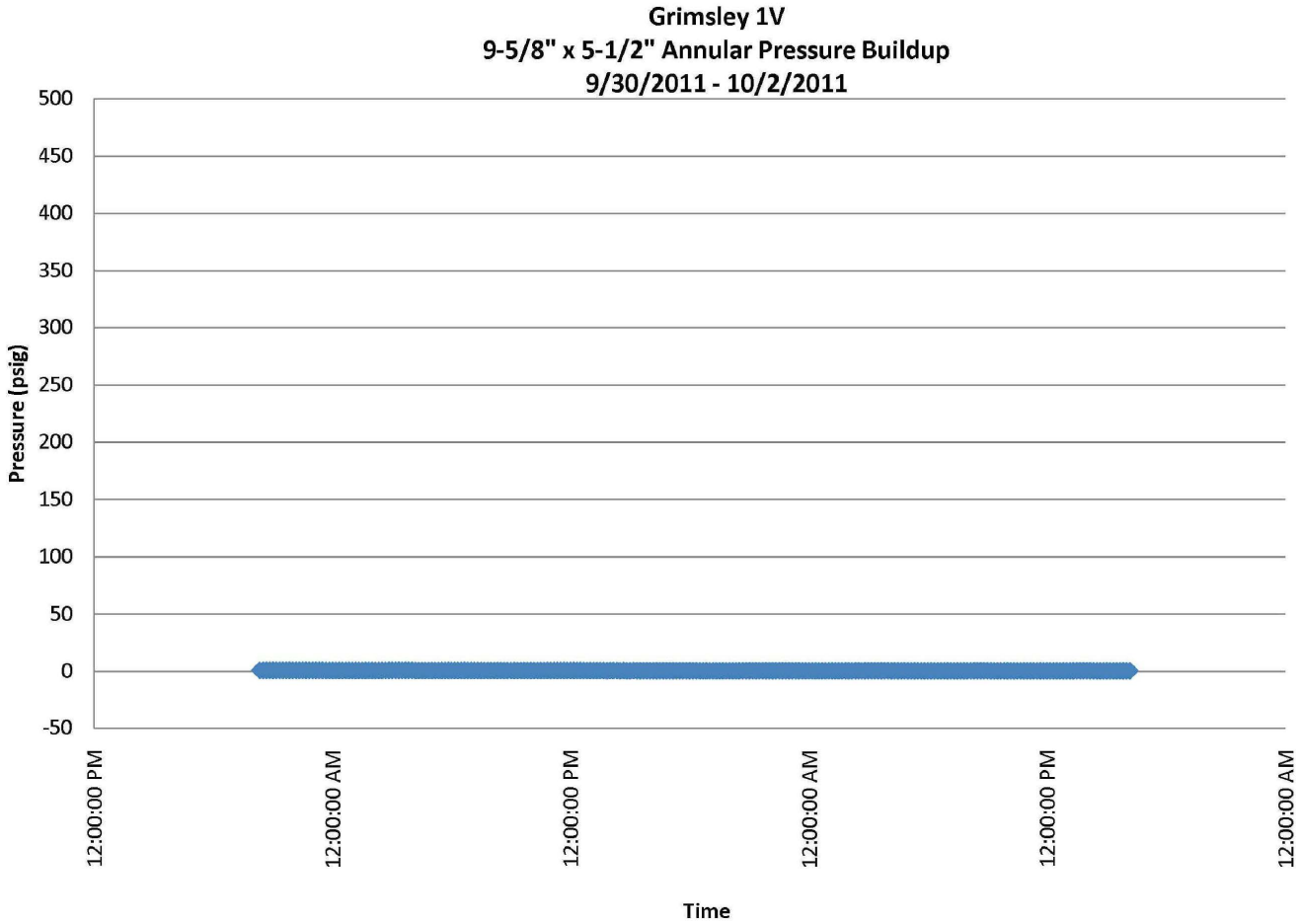
≤ 1000'	None
1000'-2500'	None

Plan Forward: Vent Annulus

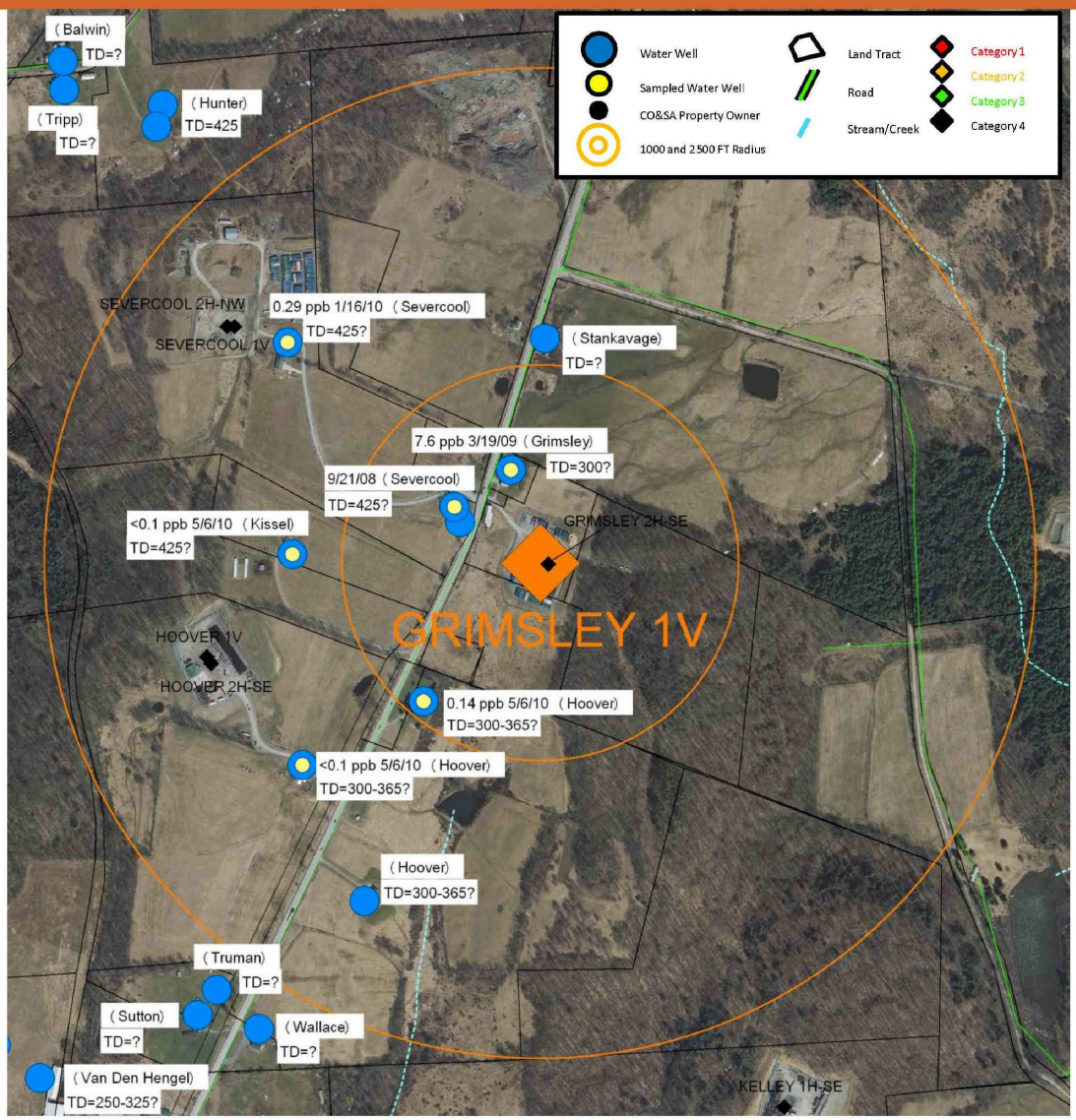
Comments:

Grimsley 1V


Grimsley #1
API 37-115-20095
Drilled 07/29/09--08/16/09
Annular Pressure - 48 hr.
5x9 = 1 psig
Elevation: 1480'
65# LS 16" Casing @ 114'KB
Coal--none reported
FW-none reported
SW--none reported
40# N80 9.625" Casing @ 1463'KB
Cmtd w/490 sks Class A (1.21)
Primary TOC @ 1100'KB (JW CBL 08/16/09)
Insert @ 7341'KB
17# P110 5.50" Casing @ 7388'KB
Cmtd w/1515 sks
LTD - 7392'
DTD @ 7398'KB


Grimsley 1V
9-5/8" x 5-1/2" Annular Pressure Buildup
9/30/2011 - 10/2/2011
Pressure (psig)
500
450
400
350
300
250
200
150
100
50
0
-50
12:00:00 PM
12:00:00 AM
12:00:00 PM
12:00:00 AM
12:00:00 PM
12:00:00 AM
Time

Grimsley 1V


Water Well
Sampled Water Well
CO&SA Property Owner
1000 and 2500 FT Radius
Land Tract
Road
Stream/Creek
Category 1
Category 2
Category 3
Category 4
(Balwin)
TD=?
(Tripp)
TD=?
(Hunter)
TD=425
SEVERCOOL 2H-NW
SEVERCOOL 1V
0.29 ppb 1/16/10 (Severcool)
TD=425?
(Stankavage)
TD=?
7.6 ppb 3/19/09 (Grimsley)
TD=300?
9/21/08 (Severcool)
TD=425?
GRIMSLEY 2H-SE
<0.1 ppb 5/6/10 (Kissel)
TD=425?
GRIMSLEY 1V
HOOVER 1V
HOOVER 2H-SE
0.14 ppb 5/6/10 (Hoover)
TD=300-365?
<0.1 ppb 5/6/10 (Hoover)
TD=300-365?
(Hoover)
TD=300-365?
(Truman)
TD=?
(Sutton)
TD=?
(Wallace)
TD=?
(Van Den Hengel)
TD=250-325?
KELLEY 1H-SE

Heitsman 4H

Gas Well: Heitsman 4H

Category: II

	Size	Depth	TOC	80% FW Gradient
Surface Pipe:	9-5/8	797	Surface	276
Intermediate Pipe:	None	-	-	-
Production:	4-1/2	9,825	Surface	-

	24 Hour		48 Hour	
7 x 9 Annulus				
Pressure PSI:	None			
Rate MCFD:				

	24 Hour		48 Hour	
	12/2010	9/2011	12/2010	9/2011
4 x 9 Annulus:				
Pressure PSI:	70	75	70	64
Rate MCFD:	-	0	-	-

Water wells > 7 MG/L:

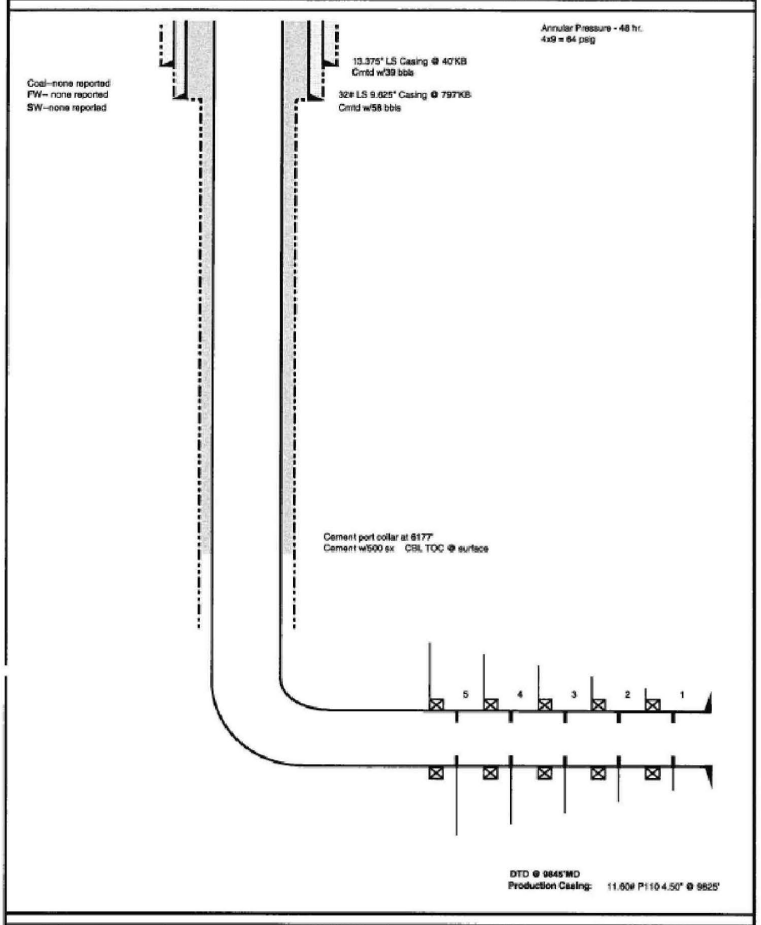
≤ 1000'	None
1000'-2500'	None

Plan Forward: Vent Annulus

Comments:

Heitsman 4H - NW

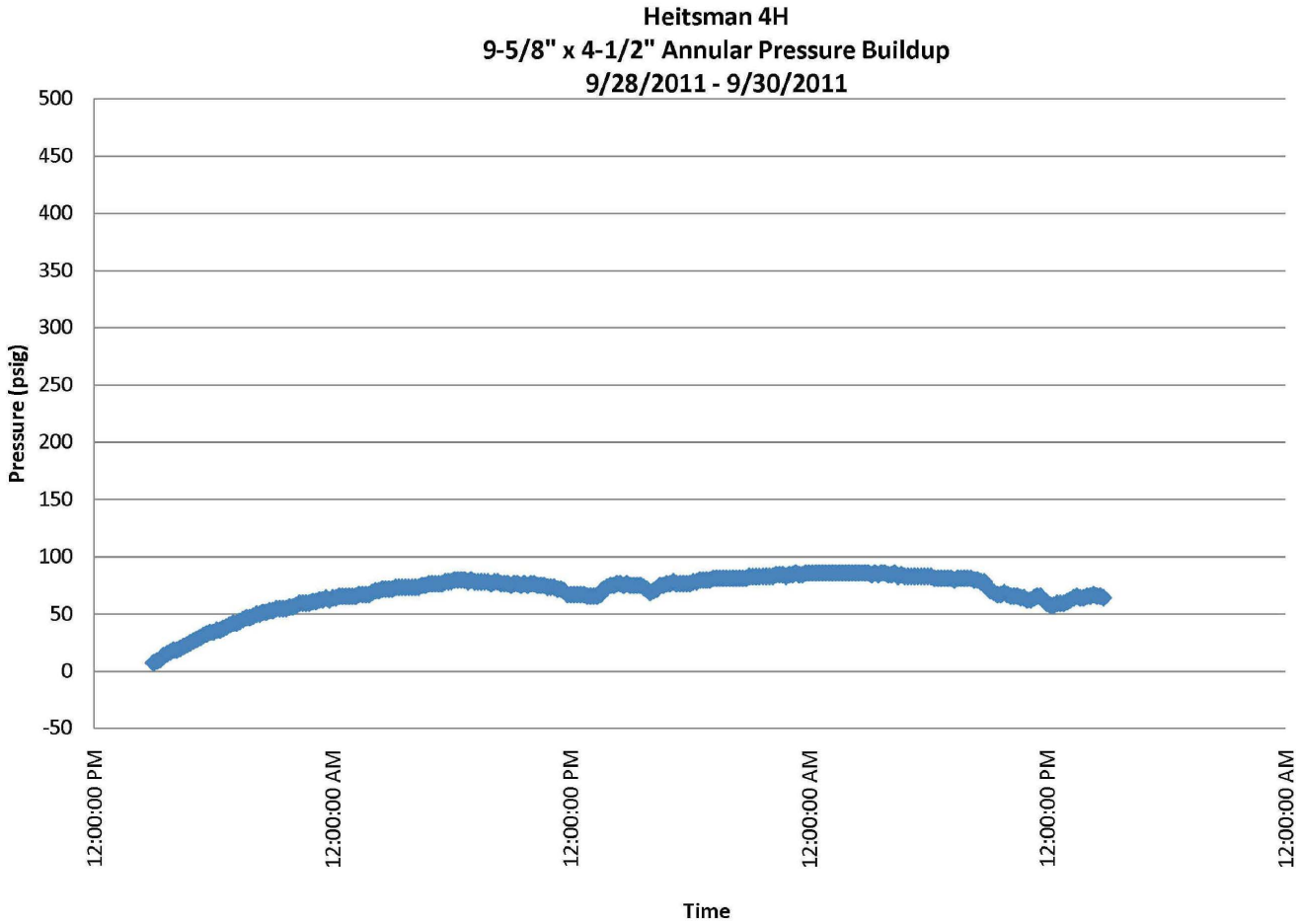
Well Name:	Heitsman 4H-NW	**County, State:**	**Susquehanna Co. PA**
API Number:	37-115-20162	**TIL Date:**	
AFE Number:		**TIL Rate:**	
Drilling Rig:		**Surf. Lattitude:**	
Drilled:	5/29-31/09, 6/01-10/09, 7/20-8/11/10	**Surf. Longitude:**	
Completed:		**KB Elevation:**	1290'
Final Open Flow:	NA	**Ground Elevation:**	1280'



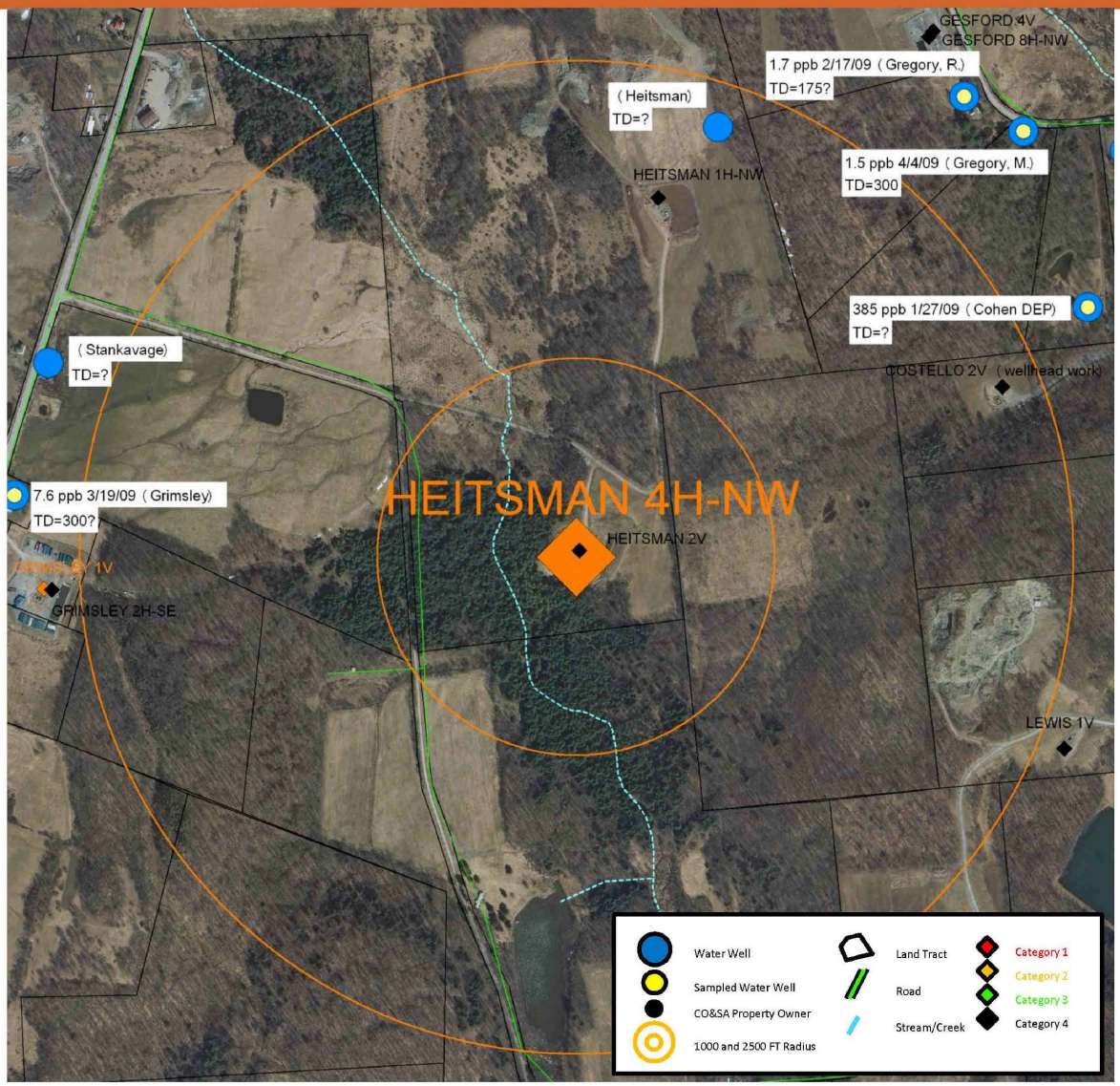
Downhole Tools:
Stimulation Co.:

Schematic is not to scale

Heitsman 4H


Heitsman 4H
9-5/8" x 4-1/2" Annular Pressure Buildup
9/28/2011 - 9/30/2011
Pressure (psig)
500
450
400
350
300
250
200
150
100
50
0
-50
12:00:00 PM
12:00:00 AM
12:00:00 PM
12:00:00 AM
12:00:00 PM
12:00:00 AM
Time

Heitsman 4H - NW



Hubbard 5H

Gas Well: Hubbard 5H

Category: II

	Size	Depth	TOC	80% FW Gradient
Surface Pipe:	9-5/8	907	Surface	314
Intermediate Pipe:	7	1,528	Surface	526
Production:	4-1/2	9,046	Surface	-

	24 Hour		48 Hour	
	11/2010	10/2011	11/2010	10/2011
7 x 9 Annulus				
Pressure PSI:	0	0	0	6
Rate MCFD:	-	0	-	-

	24 Hour		48 Hour	
	12/2010	9/2011	12/2010	9/2011
4 x 7 Annulus:				
Pressure PSI:	30	28	48	32
Rate MCFD:	-	0	-	-

Water wells > 7 MG/L:

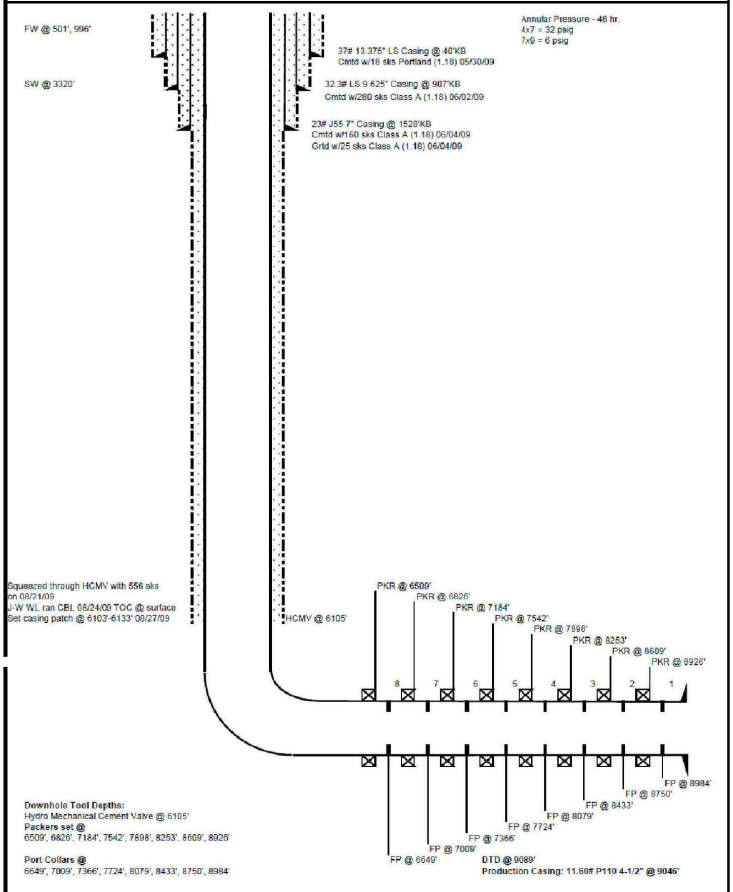
≤ 1000'	None
1000'-2500'	None

Plan Forward: Vent Annulus

Comments: Casing patch 6,103-6,133 over cement port collar. 8/27/09

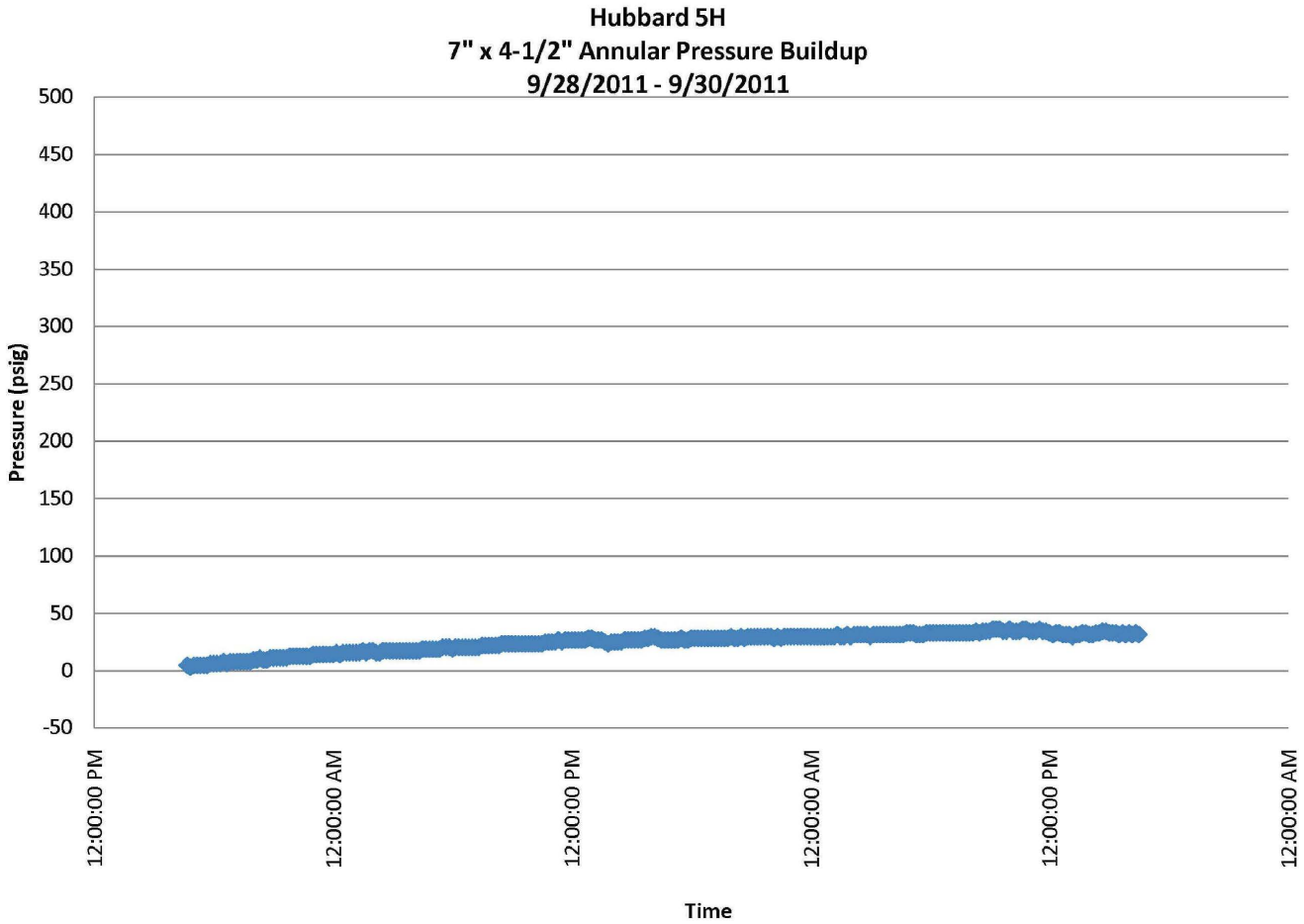
Hubbard 5H - SE

Well Name:	Hubbard 5H-SE	**County, State:**	**Susquehanna Co. PA**
API Number:	37-115-20148	**TIL Date:**	
AFE Number:		**TIL Rate:**	
Drilling Rig:		**Surf. Latitude:**	41 44' 58.26"
Drilled:	05/30-06/15/09, 06/30-07/12/09	**Surf. Longitude:**	75 52' 29.31"
Completed:		**KB Elevation:**	1350'
Final Open Flow:		**Ground Elevation:**	1340'

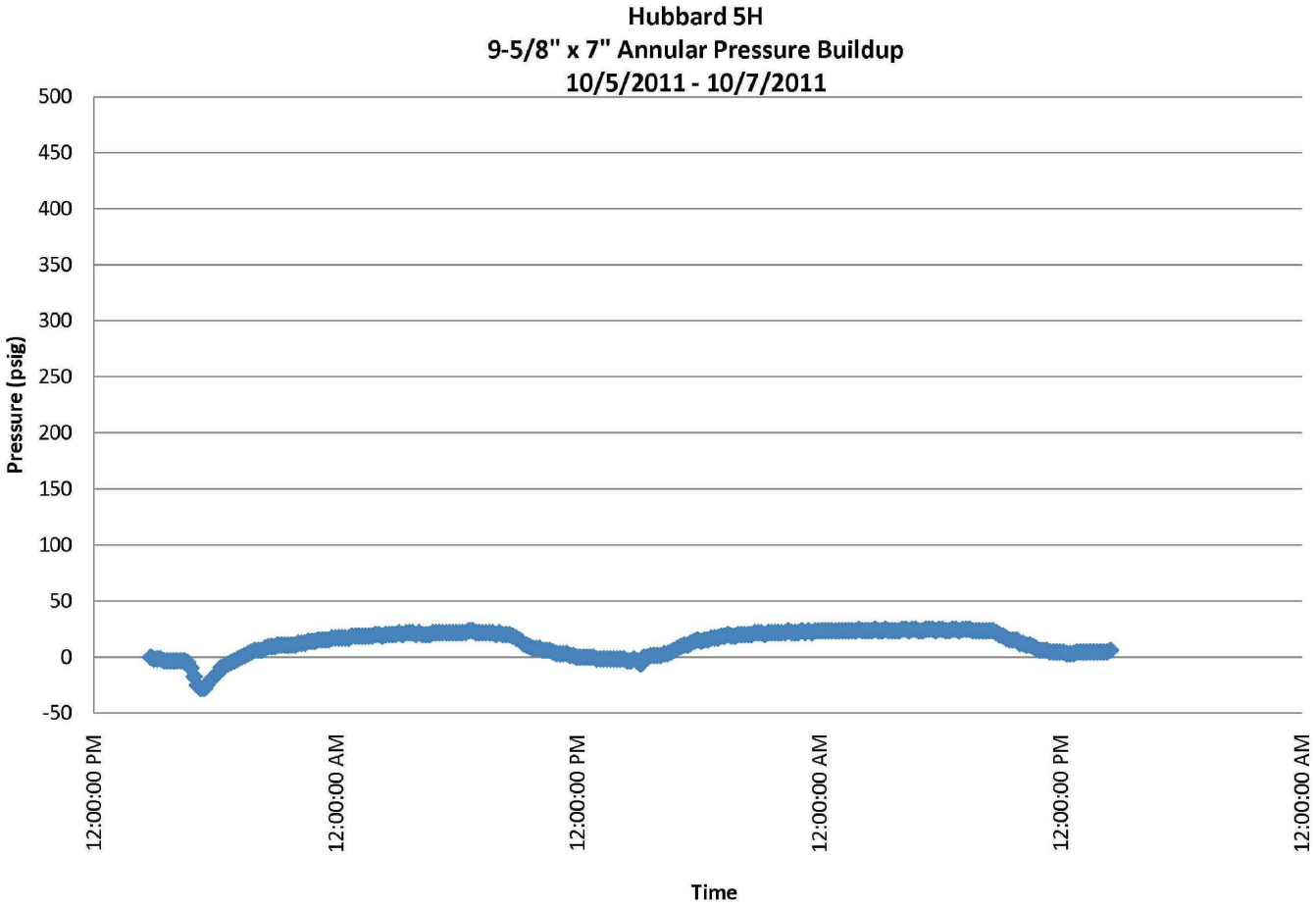


Downhole Tools: Baker Oil Tools
Stimulation Co.:

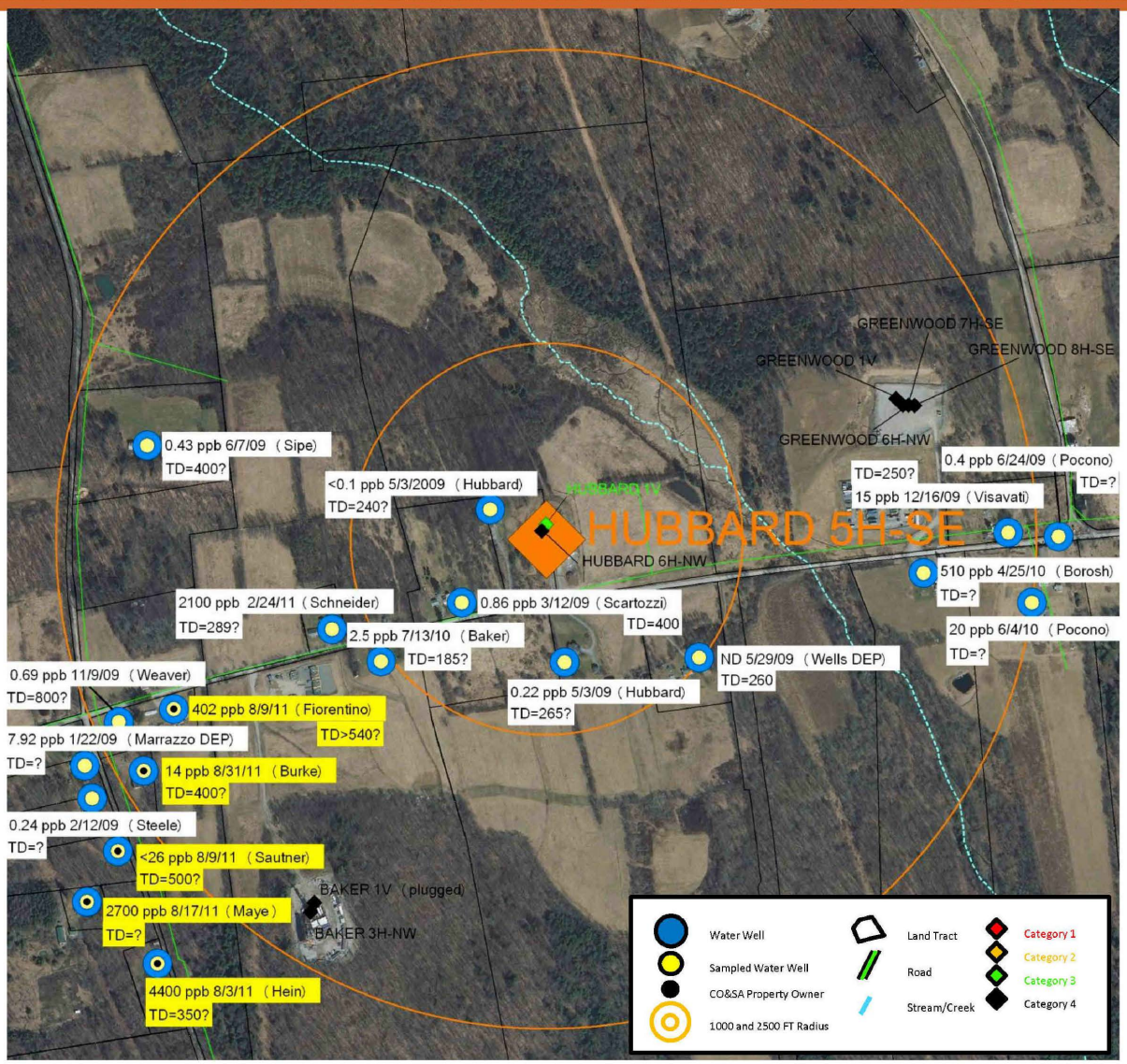
Schematic is not to scale


Hubbard 5H
7" x 4-1/2" Annular Pressure Buildup
9/28/2011 - 9/30/2011
Pressure (psig)
500
450
400
350
300
250
200
150
100
50
0
-50
12:00:00 PM
12:00:00 AM
12:00:00 PM
12:00:00 AM
12:00:00 PM
12:00:00 AM
Time

Hubbard 5H


Hubbard 5H
9-5/8" x 7" Annular Pressure Buildup
10/5/2011 - 10/7/2011
Pressure (psig)
500
450
400
350
300
250
200
150
100
50
0
-50
12:00:00 PM
12:00:00 AM
12:00:00 PM
12:00:00 AM
12:00:00 PM
12:00:00 AM
Time

Hubbard 5H - SE



Hull 1H

Gas Well: Hull 1H

Category: II

	Size	Depth	TOC	80% FW Gradient
Surface Pipe:	9-5/8	820	Surface	284
Intermediate Pipe:	None			
Production:	5-1/2	10,471	Surface	-

	24 Hour		48 Hour	
7 x 9 Annulus				
Pressure PSI:	None			
Rate MCFD:				

	24 Hour		48 Hour	
	12/2010	10/2011	12/2010	10/2011
5x 9 Annulus:				
Pressure PSI:	65	42	65	42
Rate MCFD:				

Water wells > 7 MG/L:

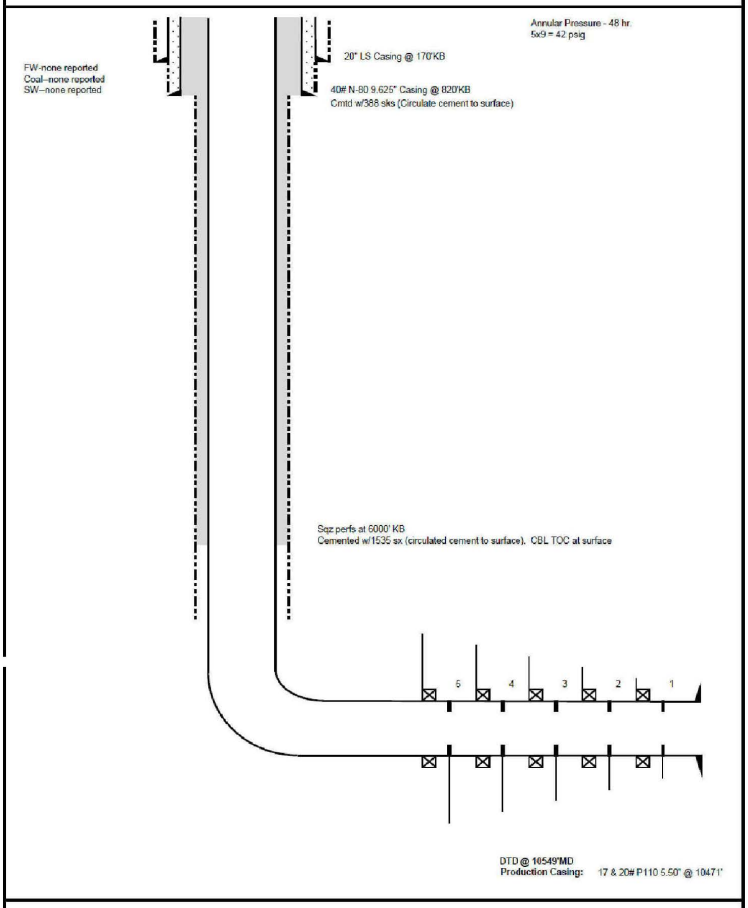
≤ 1000'	None
1000'-2500'	None

Plan Forward: Vent Annulus

Comments: Squeezed cement in 5-1/2 annulus. 10/26/09

Hull 1H - SE

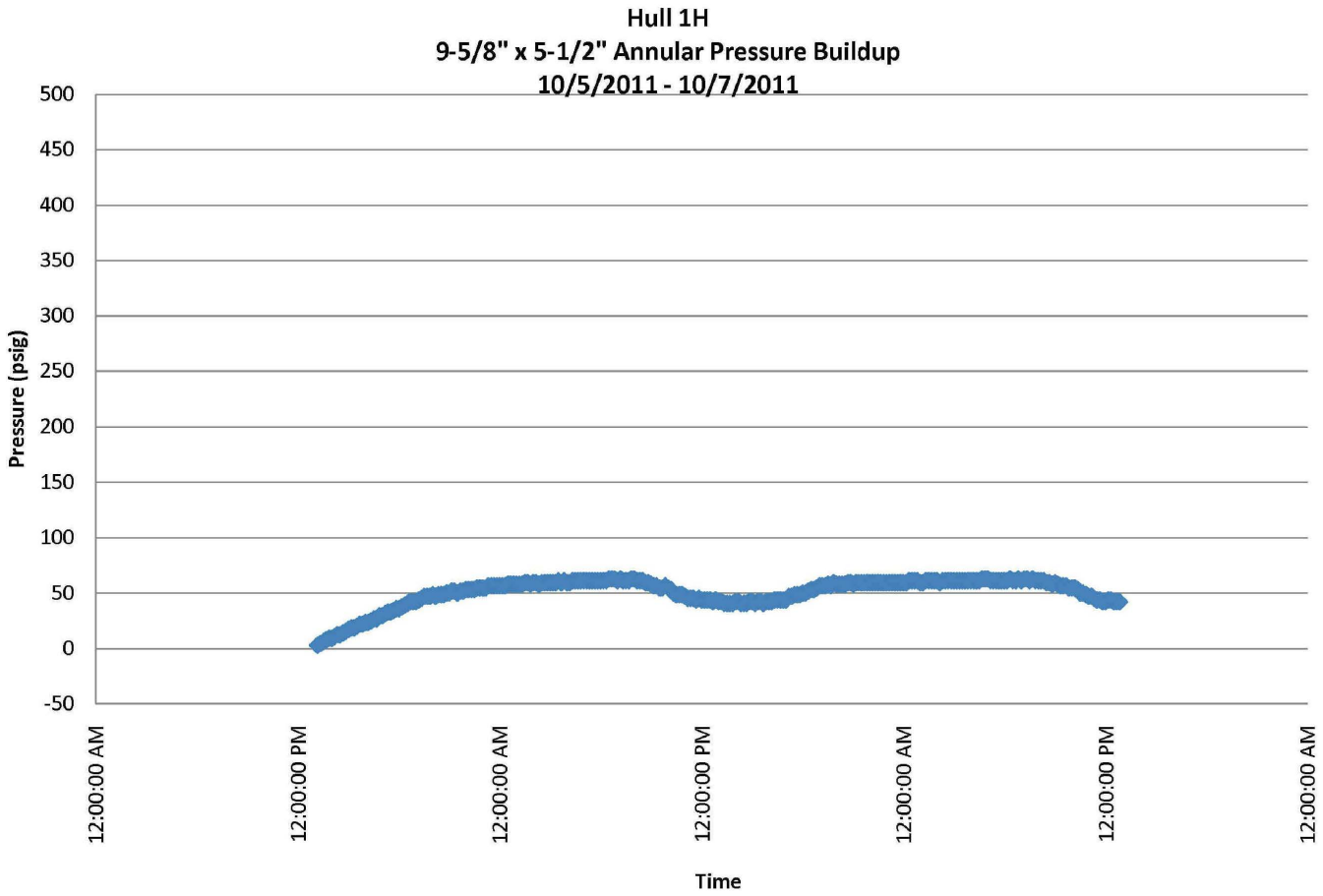
Well Name:	Hull 1H-SE	**County, State:**	**Susquehanna Co. PA**
API Number:	37-115-20122	**TIL Date:**	
AFE Number:		**TIL Rate:**	
Drilling Rig:		**Surf. Latitude:**	
Drilled:	07/22-31/09, 08/01-18/09	**Surf. Longitude:**	
Completed:		**KB Elevation:**	1351'
Final Open Flow:		**Ground Elevation:**	1330'



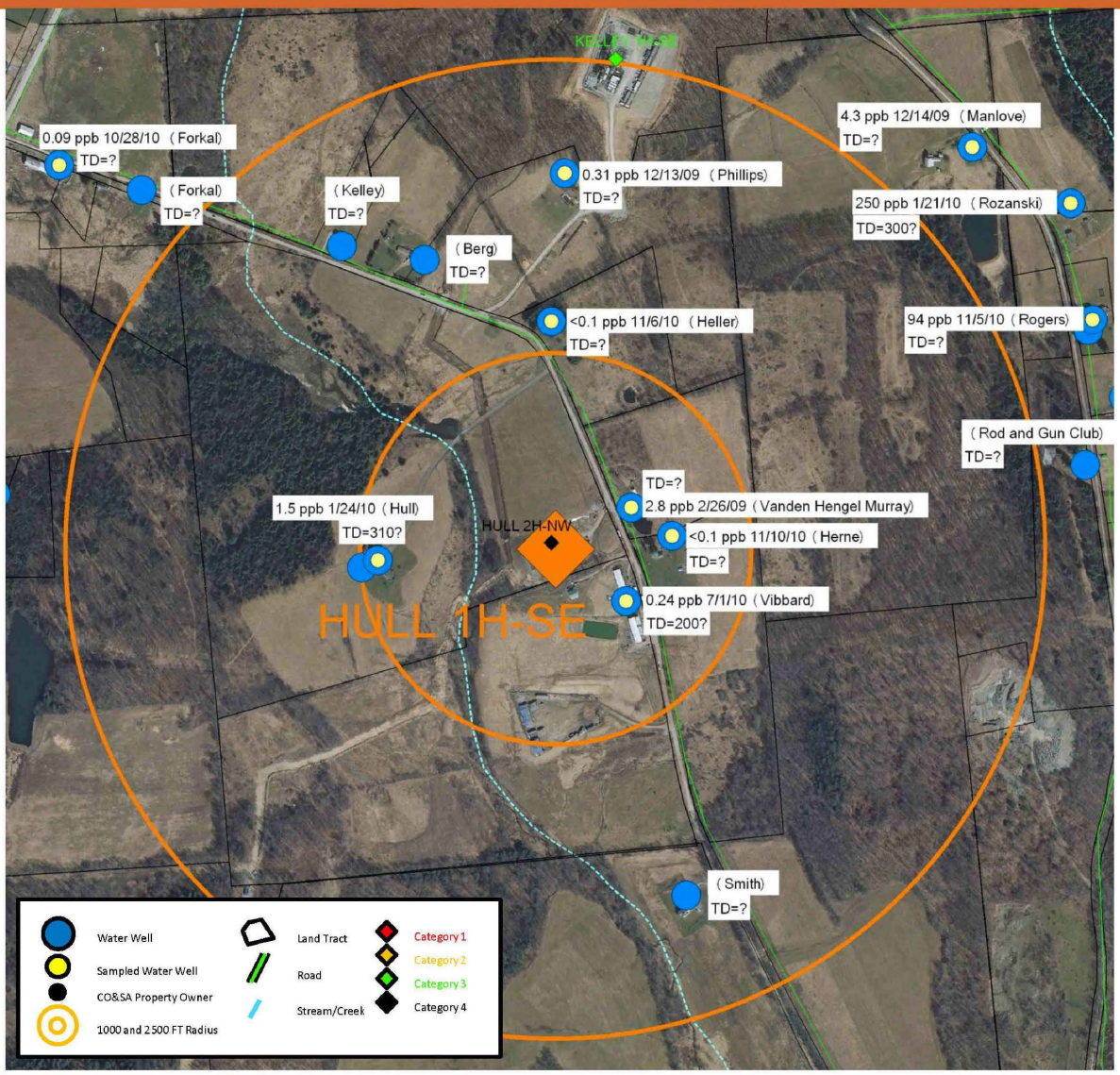
Downhole Tools:
Stimulation Co.:

Schematic is not to scale

Hull 1H - SE


Hull 1H
9-5/8" x 5-1/2" Annular Pressure Buildup
10/5/2011 - 10/7/2011
Pressure (psig)
500
450
400
350
300
250
200
150
100
50
0
-50
12:00:00 AM
12:00:00 PM
12:00:00 AM
12:00:00 PM
12:00:00 AM
12:00:00 PM
12:00:00 AM
Time

Hull 1H - SE


KELLEY 1H-SE
0.09 ppb 10/28/10 (Forkal)
TD=?
(Forkal)
TD=?
(Kelley)
TD=?
(Berg)
TD=?
0.31 ppb 12/13/09 (Phillips)
TD=?
4.3 ppb 12/14/09 (Manlove)
TD=?
250 ppb 1/21/10 (Rozanski)
TD=300?
<0.1 ppb 11/6/10 (Heller)
TD=?
94 ppb 11/5/10 (Rogers)
TD=?
(Rod and Gun Club)
TD=?
TD=?
2.8 ppb 2/26/09 (Vanden Hengel Murray)
1.5 ppb 1/24/10 (Hull)
TD=310?
HULL 2H-NW
<0.1 ppb 11/10/10 (Herne)
TD=?
0.24 ppb 7/1/10 (Vibbard)
TD=200?
HULL 1H-SE
(Smith)
TD=?
Water Well
Sampled Water Well
CO&SA Property Owner
1000 and 2500 FT Radius
Land Tract
Road
Stream/Creek
Category 1
Category 2
Category 3
Category 4

Teel 6V

Gas Well: Teel 6V

Category: II

	Size	Depth	TOC	80% FW Gradient
Surface Pipe:	9-5/8	890	Surface	308
Intermediate Pipe:	7	1,460	Surface	506
Production:	4-1/2	7,428	1,540	-

	24 Hour		48 Hour	
	12/2010	10/2011	12/2010	10/2011
7 x 9 Annulus				
Pressure PSI:	0	0	0	0
Rate MCFD:	-	0	-	-

	24 Hour		48 Hour	
	12/2010	9/2011	12/2010	9/2011
4 x 7 Annulus:				
Pressure PSI:	50	20	60	27
Rate MCFD:	-	0	-	-

Water wells > 7 MG/L:

≤ 1000'	None
1000'-2500'	None

Plan Forward: Vent Annulus

Comments: Squeezed cement in 4-1/2 annulus. 7/11/09

Teel 6V

Teel 6
API 37-115-20011

Drilled 12/02--21/08

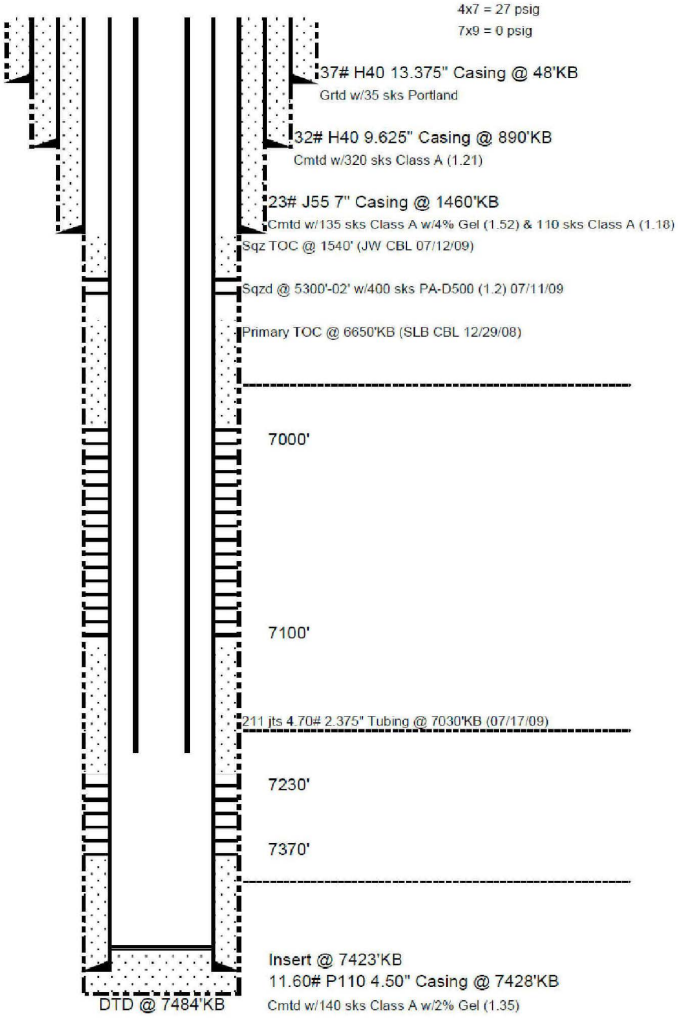
Annular Pressure - 48 hr.
4x7 = 27 psig
7x9 = 0 psig

Elevation: 1250'

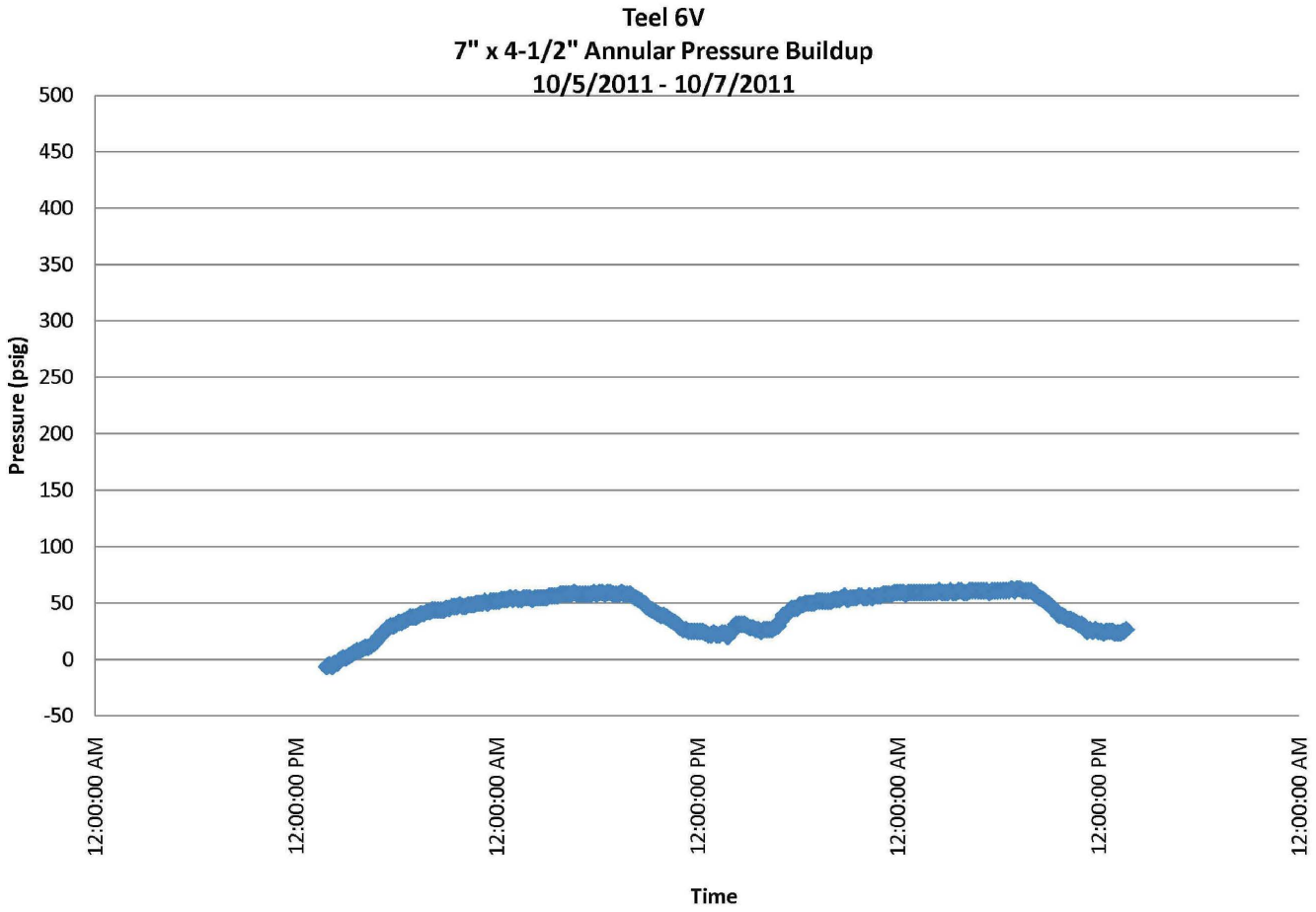
FW @ 230'

Coal--none reported

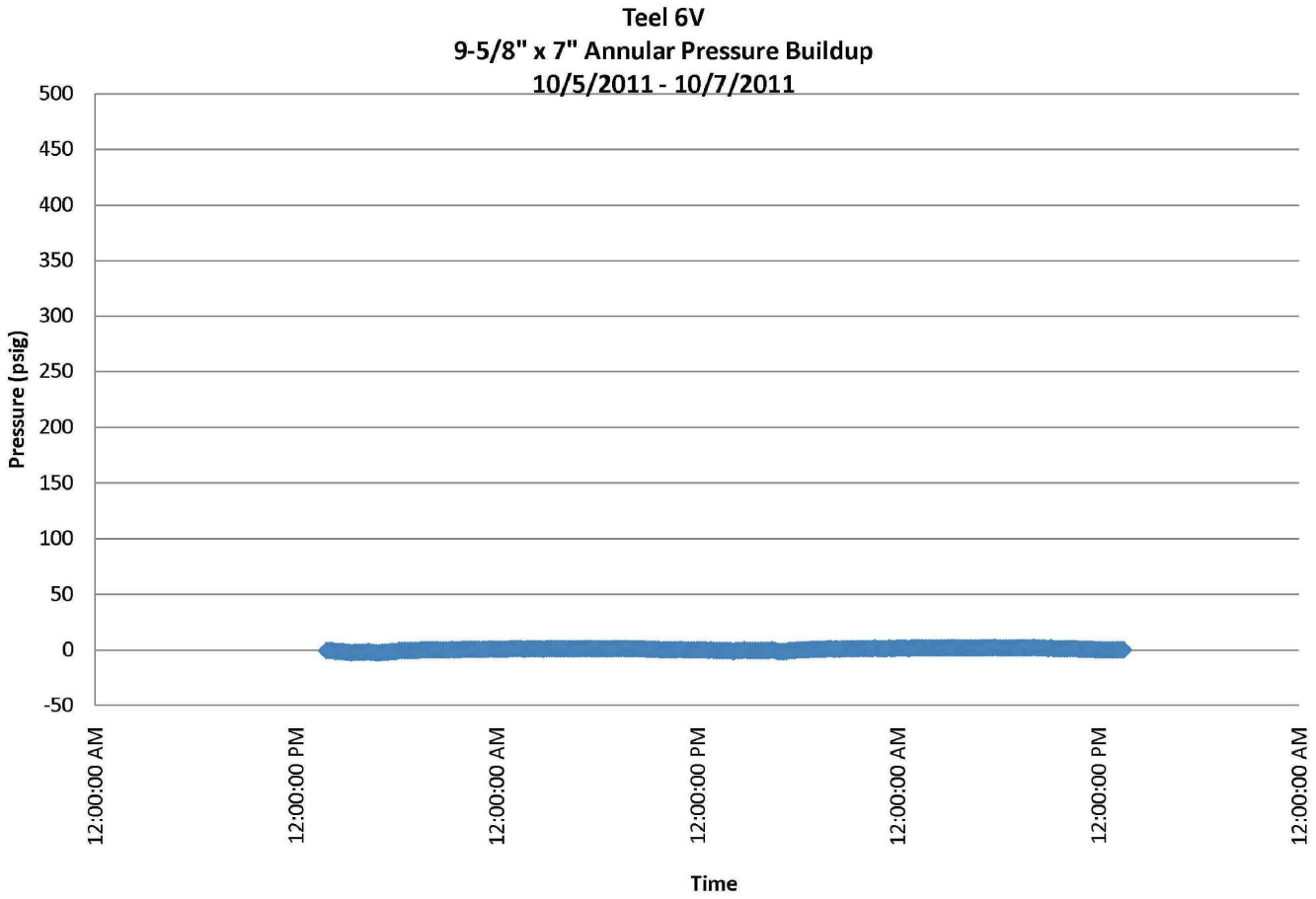
SW--none reported



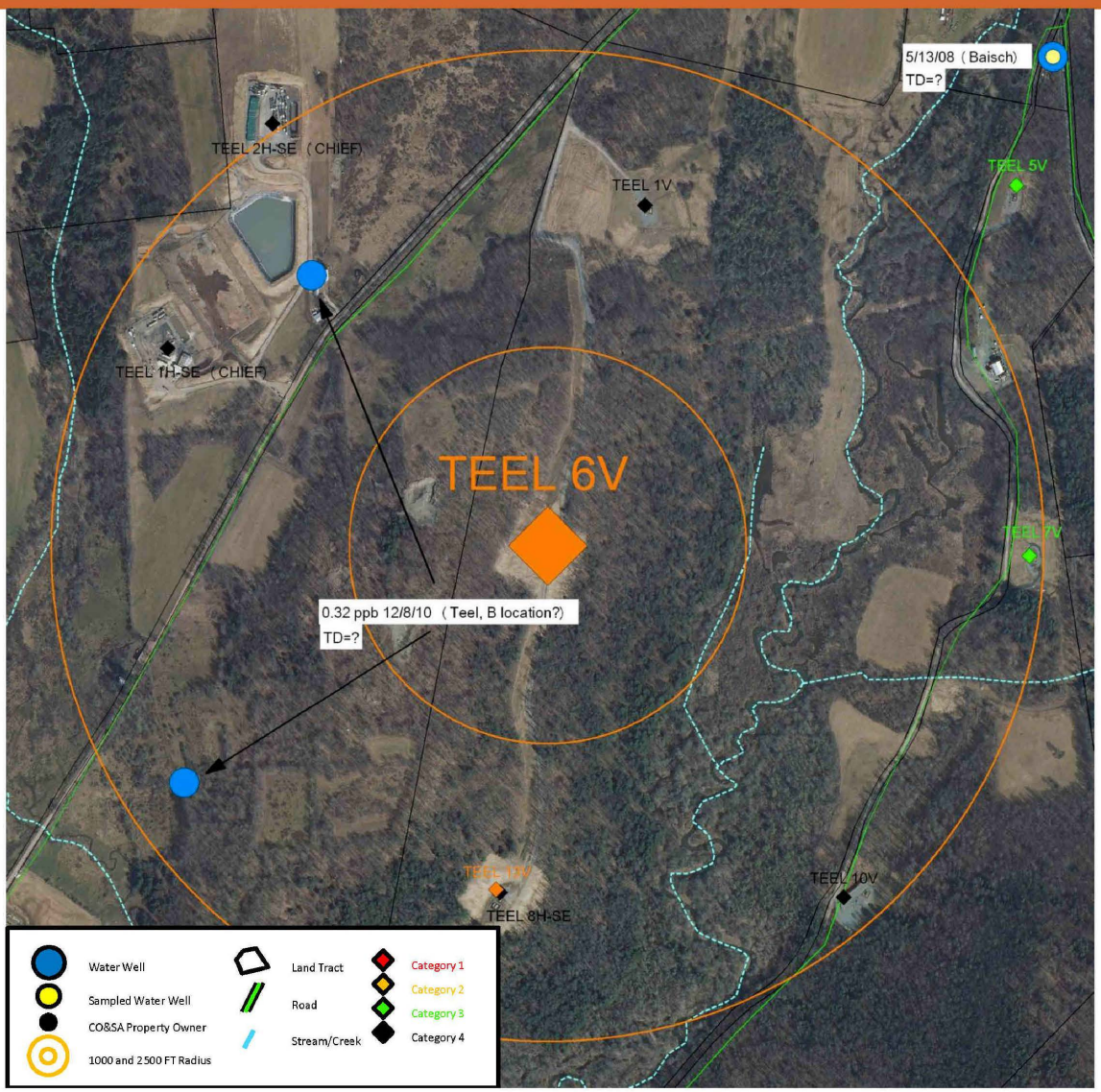
Teel 6V


Teel 6V
7" x 4-1/2" Annular Pressure Buildup
10/5/2011 - 10/7/2011
Pressure (psig)
500
450
400
350
300
250
200
150
100
50
0
-50
12:00:00 AM
12:00:00 PM
12:00:00 AM
12:00:00 PM
12:00:00 AM
12:00:00 PM
12:00:00 AM
Time

Teel 6V


Teel 6V
9-5/8" x 7" Annular Pressure Buildup
10/5/2011 - 10/7/2011
Pressure (psig)
500
450
400
350
300
250
200
150
100
50
0
-50
12:00:00 AM
12:00:00 PM
12:00:00 AM
12:00:00 PM
12:00:00 AM
12:00:00 PM
12:00:00 AM
Time

Teel 6V


5/13/08 (Baisch)
TD=?
TEEL 2H-SE (CHIEF)
TEEL 1V
TEEL 5V
TEEL 1H-SE (CHIEF)
TEEL 6V
TEEL 7V
0.32 ppb 12/8/10 (Teel, B location?)
TD=?
TEEL 10V
TEEL 8H-SE
Water Well
Sampled Water Well
CO&SA Property Owner
1000 and 2500 FT Radius
Land Tract
Road
Stream/Creek
Category 1
Category 2
Category 3
Category 4

Teel 13V

Gas Well: Teel 13V

Category: II

	Size	Depth	TOC	80% FW Gradient
Surface Pipe:	9-5/8	900	Surface	312
Intermediate Pipe:	7	1,502	Surface	520
Production:	4-1/2	7,220	540	-

	24 Hour		48 Hour	
	1/2010	9/2011	1/2010	9/2011
7 x 9 Annulus				
Pressure PSI:	0	1	0	0
Rate MCFD:	-	0	-	-

	24 Hour		48 Hour	
	1/2010	9/2011	1/2010	9/2011
4 x 7 Annulus:				
Pressure PSI:	60	33	110	52
Rate MCFD:	-	0	-	-

Water wells > 7 MG/L:

≤ 1000'	None
1000'-2500'	None

Plan Forward: Vent Annulus

Comments:

Teel 13V

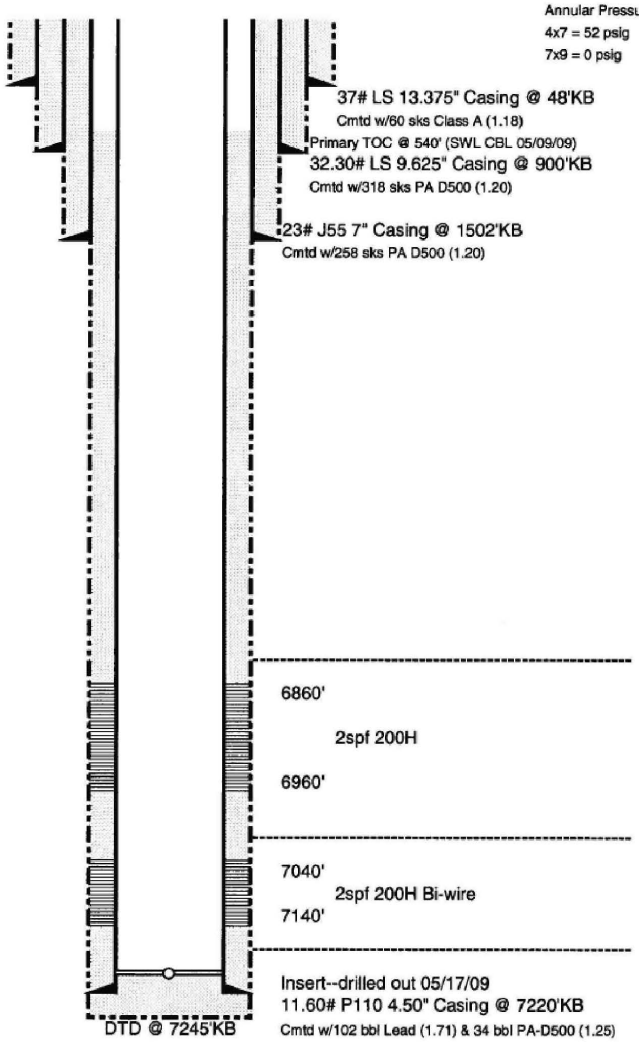
Teel 13V
API 37-115-20116 Drilled 04/15-05/05/09

Elevation: 1115'

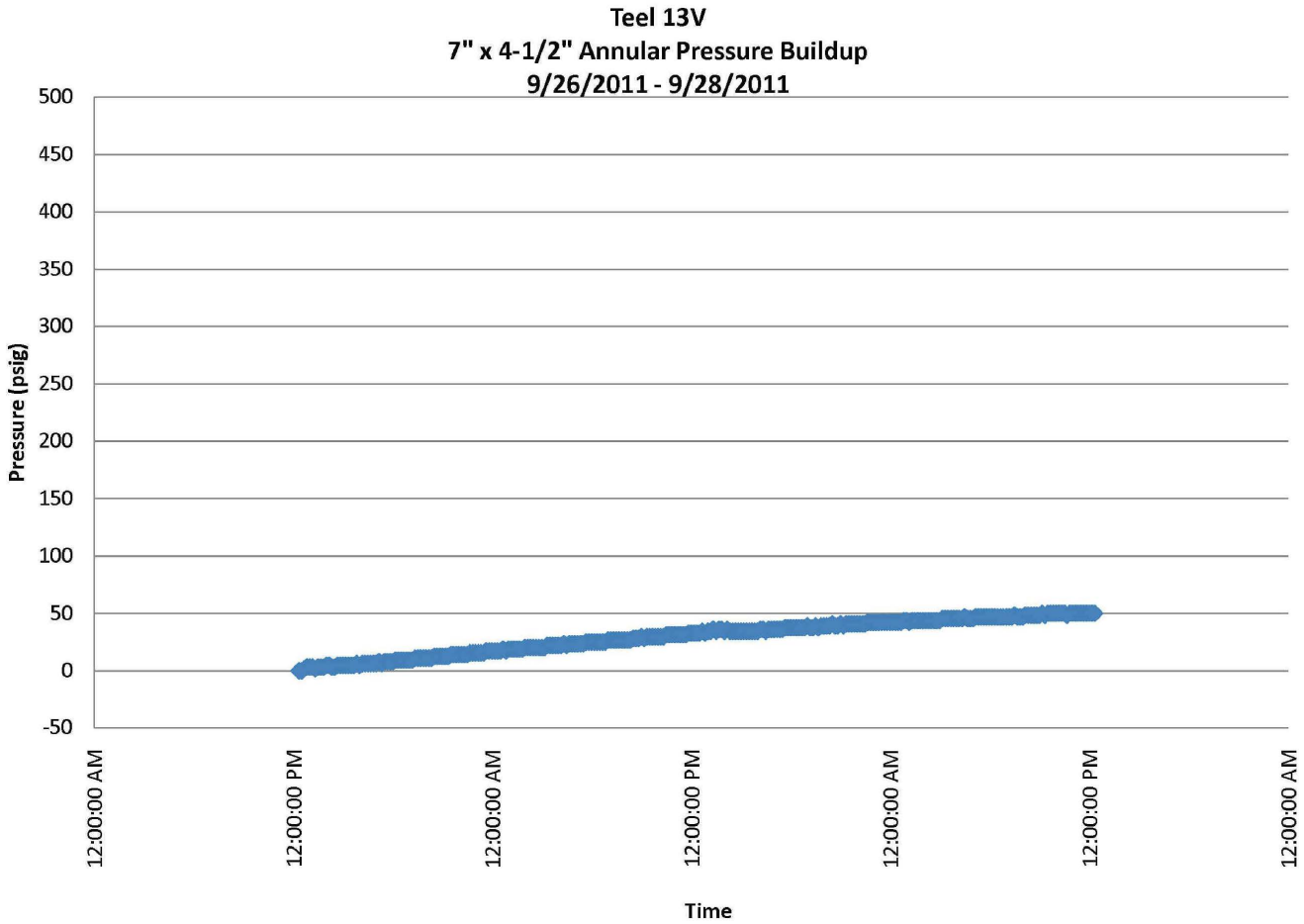
FW @ 325'

Coal--none reported

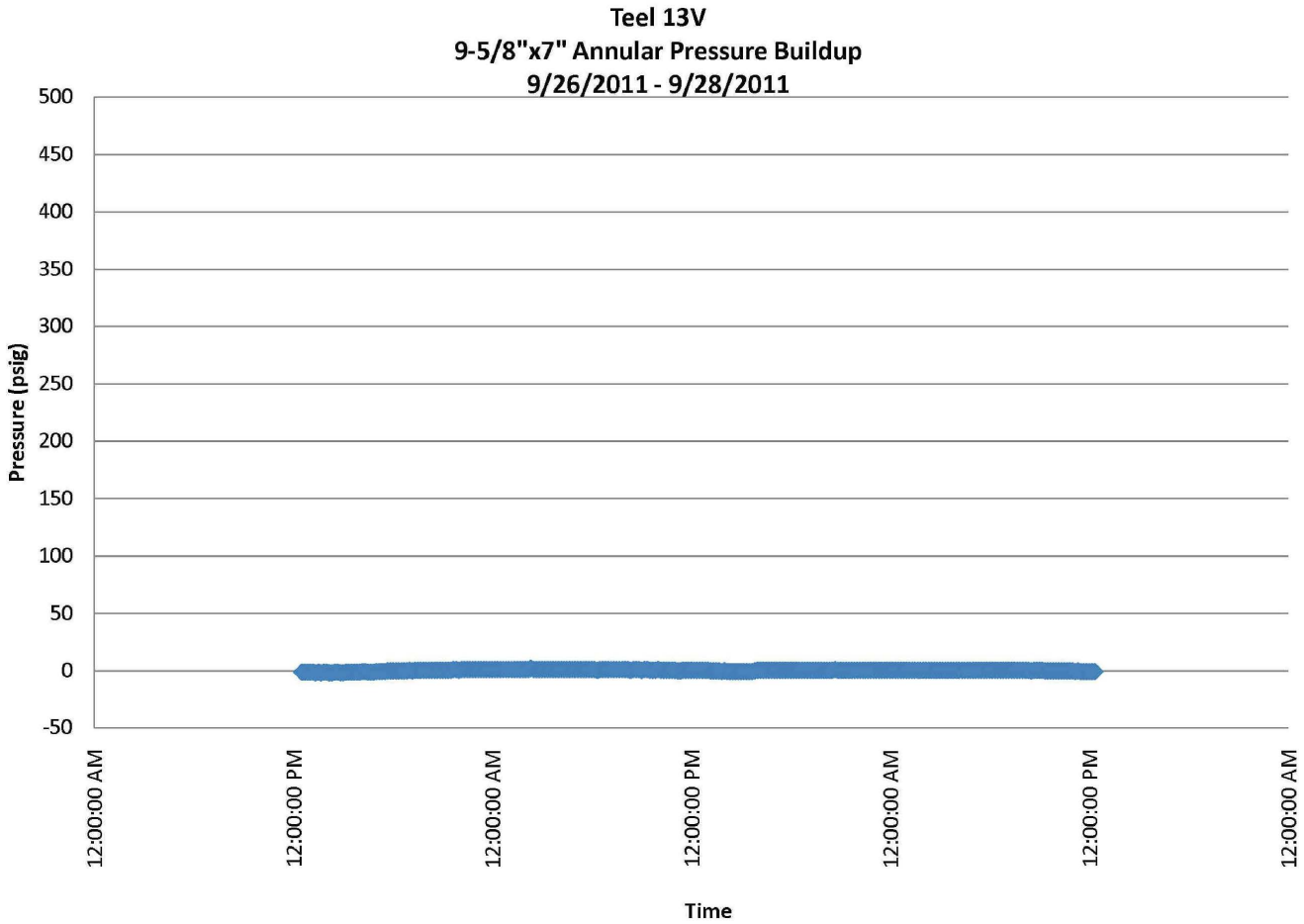
SW--none reported



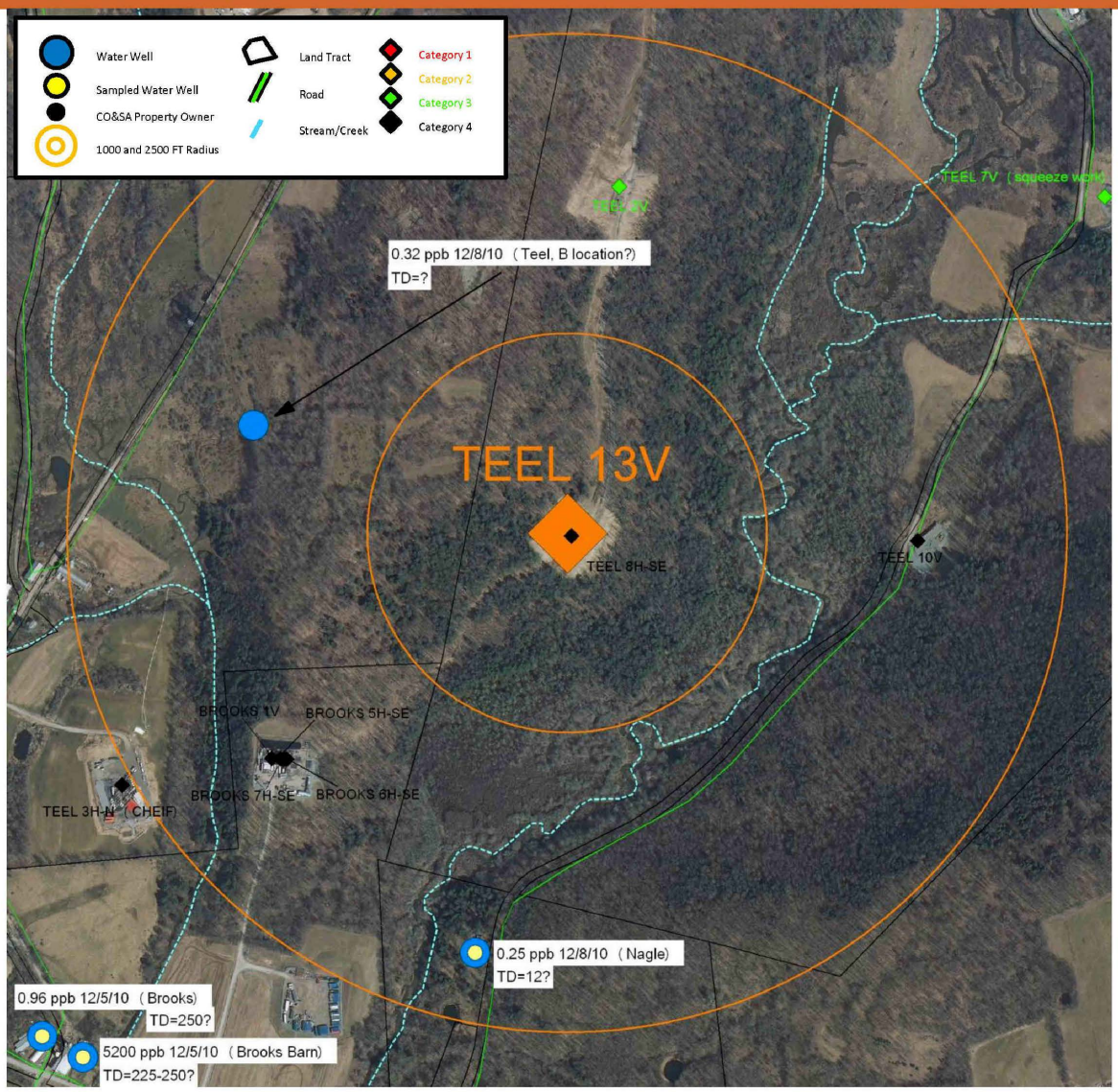
Teel 13V


Teel 13V
7" x 4-1/2" Annular Pressure Buildup
9/26/2011 - 9/28/2011
Pressure (psig)
500
450
400
350
300
250
200
150
100
50
0
-50
12:00:00 AM
12:00:00 PM
12:00:00 AM
12:00:00 PM
12:00:00 AM
12:00:00 PM
12:00:00 AM
Time

Teel 13V


Teel 13V
9-5/8"x7" Annular Pressure Buildup
9/26/2011 - 9/28/2011
Pressure (psig)
500
450
400
350
300
250
200
150
100
50
0
-50
12:00:00 AM
12:00:00 PM
12:00:00 AM
12:00:00 PM
12:00:00 AM
12:00:00 PM
12:00:00 AM
Time

Teel 13V


Water Well
Sampled Water Well
CO&SA Property Owner
1000 and 2500 FT Radius
Land Tract
Road
Stream/Creek
Category 1
Category 2
Category 3
Category 4
TEEL 7V (squeeze work)
0.32 ppb 12/8/10 (Teel, B location?)
TD=?
TEEL 13V
TEEL 8H-SE
TEEL 10V
BROOKS 1V
BROOKS 5H-SE
BROOKS 7H-SE
BROOKS 6H-SE
TEEL 3H-N (CHEIF)
0.25 ppb 12/8/10 (Nagle)
TD=12?
0.96 ppb 12/5/10 (Brooks)
TD=250?
5200 ppb 12/5/10 (Brooks Barn)
TD=225-250?

Remediation History – Category II

Well Name	Remediation History
Costello 1V	Squeezed cement in 4-1/2 annulus. (4,995'-1,450') w/ 340 Sx – 3/18/2009.
Ely 1H	Well is not completed.
Grimsley, J. 1V	None.
Heitsman 4H	None.
Hubbard 5H	Casing patch (6,103'-6,133') over cement port collar – 8/27/09.
Hull 1H	Squeezed cement in 5-1/2 annulus. (6,000'-0') w/ 1,535 Sx – 10/26/2009.
Teel 6V	Squeezed cement in 4-1/2 annulus. (5,000'-1,540') w/ 400 Sx – 7/11/09.
Teel 13V	None.

Summary – Category II

Well Name	Comments	Action Taken	Action Plan
Costello 1V	4x7 pressure increased	Run temp/noise log – Vent Annulus	None
Ely 1H	4x7 pressure decreased	Vent Annulus	None
Grimsley 1V	Annular pressure decreased,5x9 – 1 psi	Vent Annulus	None
Heitsman 4H	Annular pressure flat	Vent Annulus	None
Hubbard 5H	7x9 – 6 psi, minor increase, 4x7 – 32 psi, minor decrease	Vent Annulus	None
Hull 1H	Annular pressure decreased	Vent Annulus	None
Teel 6V	Annular pressure decreased	Vent Annulus	None
Teel 13V	Annular pressure decreased	Vent Annulus	None

Category: III

Gas present in the annular space between the production casing and the intermediate casing, but open formations/intervals may explain the presence of gas in this annular space.

Category III (8 wells)

- 6 wells - annular pressure decreased or flat
- 2 wells - annular pressure increase

Ely 7H

Gas Well: Ely 7H

Category: III

	Size	Depth	TOC	80% FW Gradient
Surface Pipe:	9-5/8	1,510	Surface	523
Intermediate Pipe:	None			
Production:	4-1/2	9,915	3,000	-

	24 Hour		48 Hour	
7 x 9 Annulus				
Pressure PSI:	None			
Rate MCFD:				

	24 Hour		48 Hour	
	11/2010	9/2011	11/2010	9/2011
4 x 9 Annulus:				
Pressure PSI:	40	0	68	0
Rate MCFD:	-	0	-	-

Water wells > 7 MG/L:

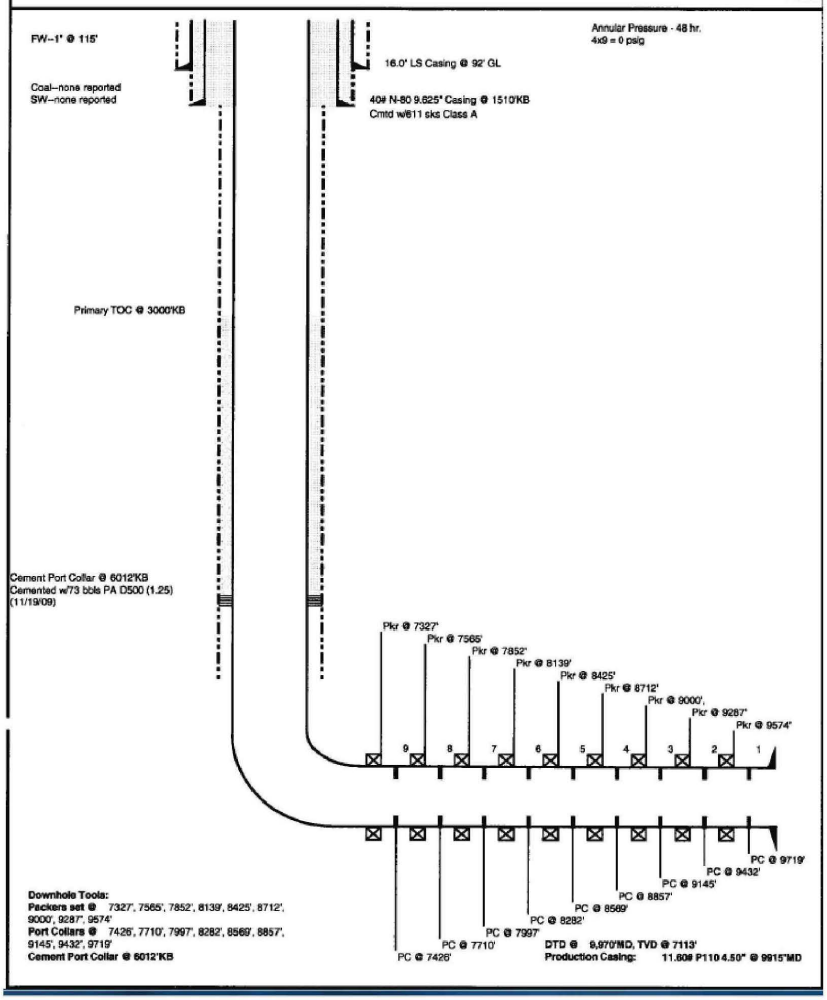
≤ 1000'	None
1000'-2500'	None

Plan Forward: Vent Annulus

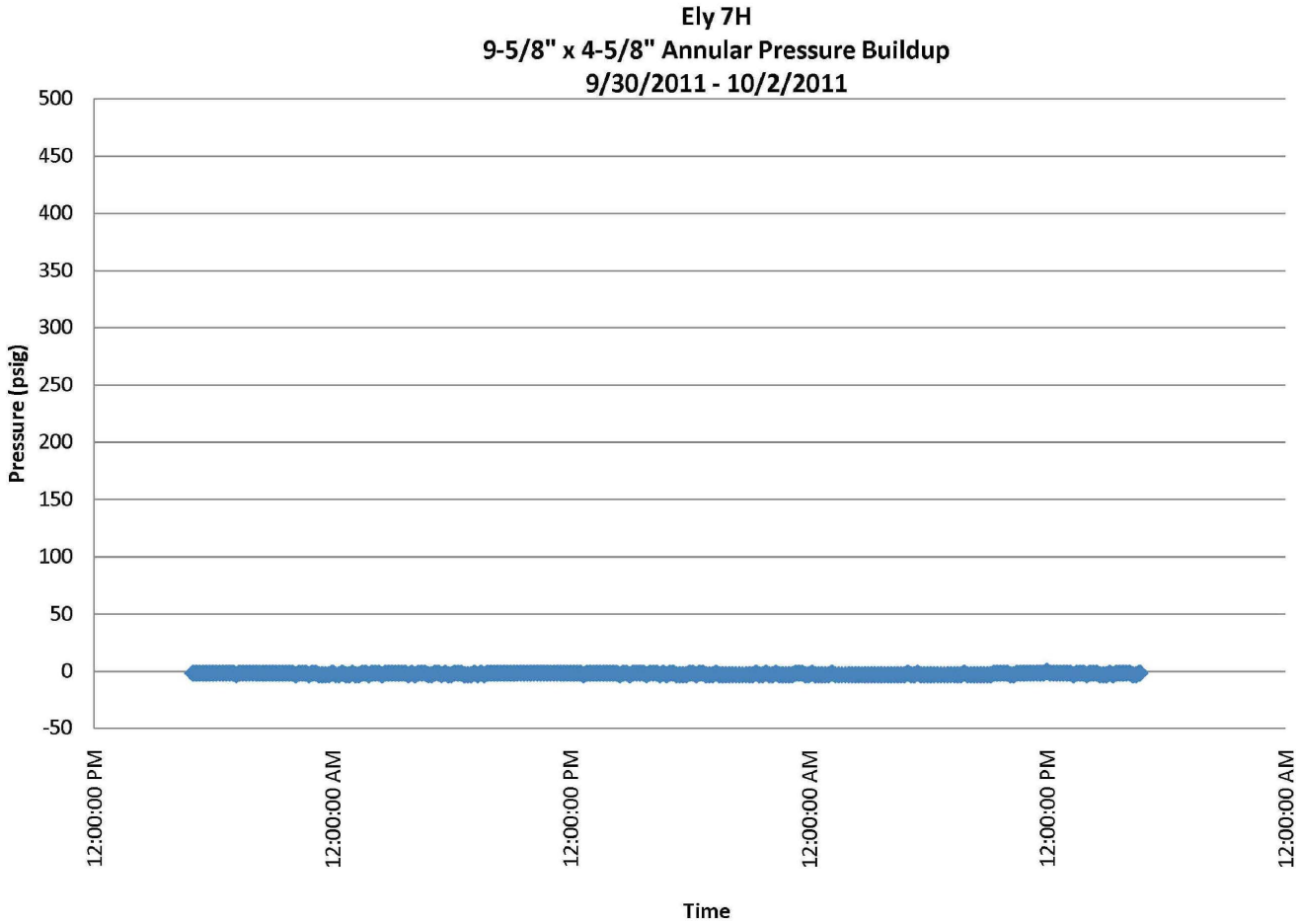
Comments: Well is not completed.

Ely 7H

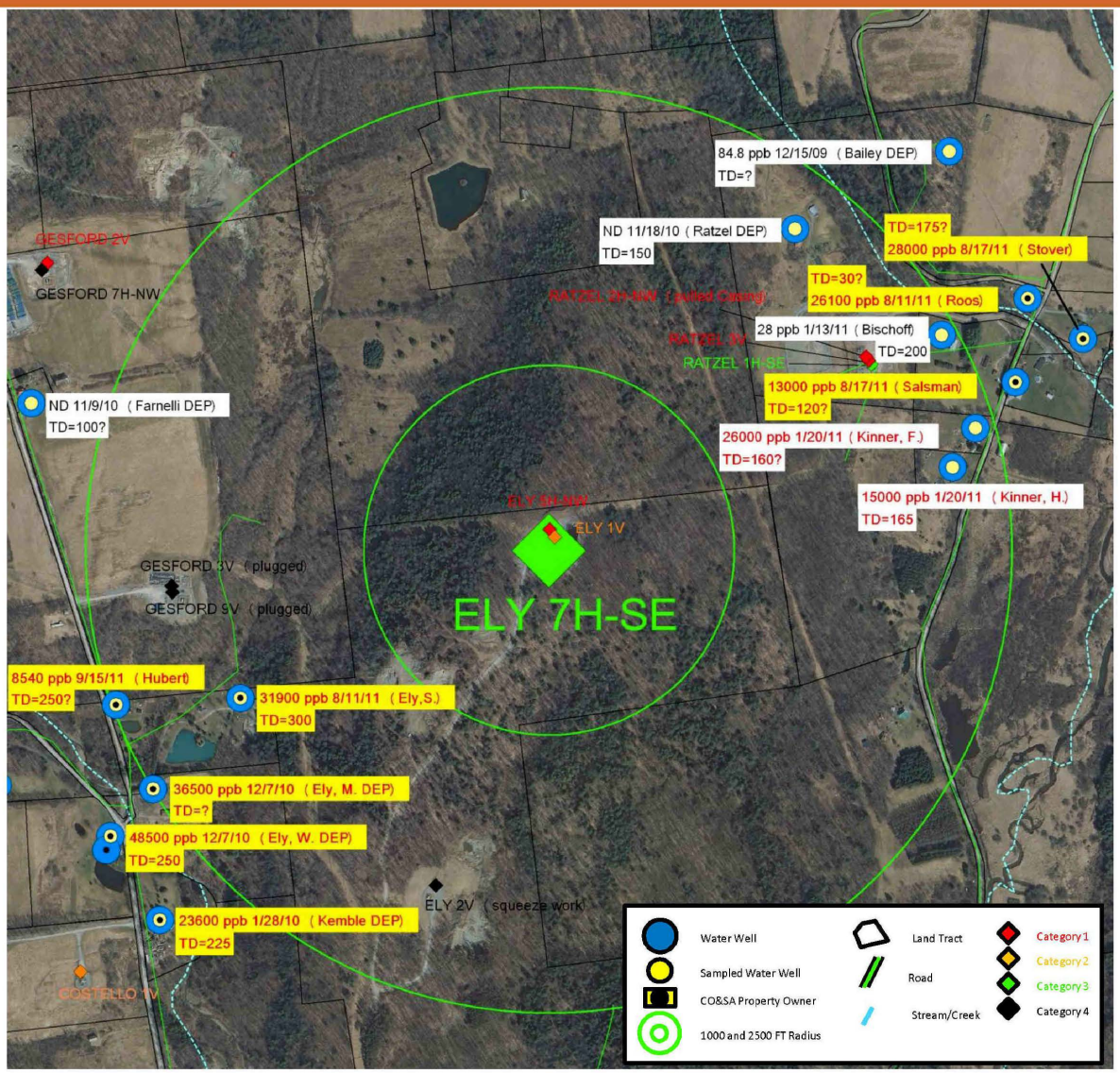
Well Name:	Ely 7H	**County, State:**	**Susquehanna Co. PA**
API Number:	37-115-20160	**TIL Date:**	
AFE Number:		**TIL Rate:**	
Drilling Rig:		**Surf. Latitude:**	
Drilled:	8/02/09--11/10/09	**Surf. Longitude:**	
Completed:		**KB Elevation:**	1550'
Final Open Flow:		**Ground Elevation:**	1540'



Ely 7H


Ely 7H
9-5/8" x 4-5/8" Annular Pressure Buildup
9/30/2011 - 10/2/2011
Pressure (psig)
500
450
400
350
300
250
200
150
100
50
0
-50
12:00:00 PM
12:00:00 AM
12:00:00 PM
12:00:00 AM
12:00:00 PM
12:00:00 AM
Time

Ely 7H - SE


84.8 ppb 12/15/09 (Bailey DEP)
TD=?
ND 11/18/10 (Ratzel DEP)
TD=150
TD=175?
28000 ppb 8/17/11 (Stover)
GESFORD 2V
GESFORD 7H-NW
TD=30?
26100 ppb 8/11/11 (Roos)
RATZEL 2H-NW (pulled Casing)
28 ppb 1/13/11 (Bischoff)
TD=200
RATZEL 3V
RATZEL 1H-SE
13000 ppb 8/17/11 (Salsman)
TD=120?
ND 11/9/10 (Farnelli DEP)
TD=100?
26000 ppb 1/20/11 (Kinner, F.)
TD=160?
15000 ppb 1/20/11 (Kinner, H.)
TD=165
ELY 9H-NW
ELY 1V
GESFORD 3V (plugged)
GESFORD 5V (plugged)
ELY 7H-SE
8540 ppb 9/15/11 (Hubert)
TD=250?
31900 ppb 8/11/11 (Ely,S.)
TD=300
36500 ppb 12/7/10 (Ely, M. DEP)
TD=?
48500 ppb 12/7/10 (Ely, W. DEP)
TD=250
ELY 2V (squeeze work)
23600 ppb 1/28/10 (Kemble DEP)
TD=225
COSTELLO 1V
Water Well
Sampled Water Well
CO&SA Property Owner
1000 and 2500 FT Radius
Land Tract
Road
Stream/Creek
Category 1
Category 2
Category 3
Category 4

Gesford 1V

Gas Well: Gesford 1V

Category: III

	Size	Depth	TOC	80% FW Gradient
Surface Pipe:	11-3/4	929	Surface	322
Intermediate Pipe:	8-5/8	1,543	Surface	534
Production:	5-1/2	7,055	Surface	-

	24 Hour		48 Hour	
8 x 11 Annulus				
Pressure PSI:	-			
Rate MCFD:				

	24 Hour		48 Hour	
	11/2010	10/2011	11/2010	10/2011
5 x 8 Annulus:				
Pressure PSI:	10	0	18	1
Rate MCFD:	-	0	-	-

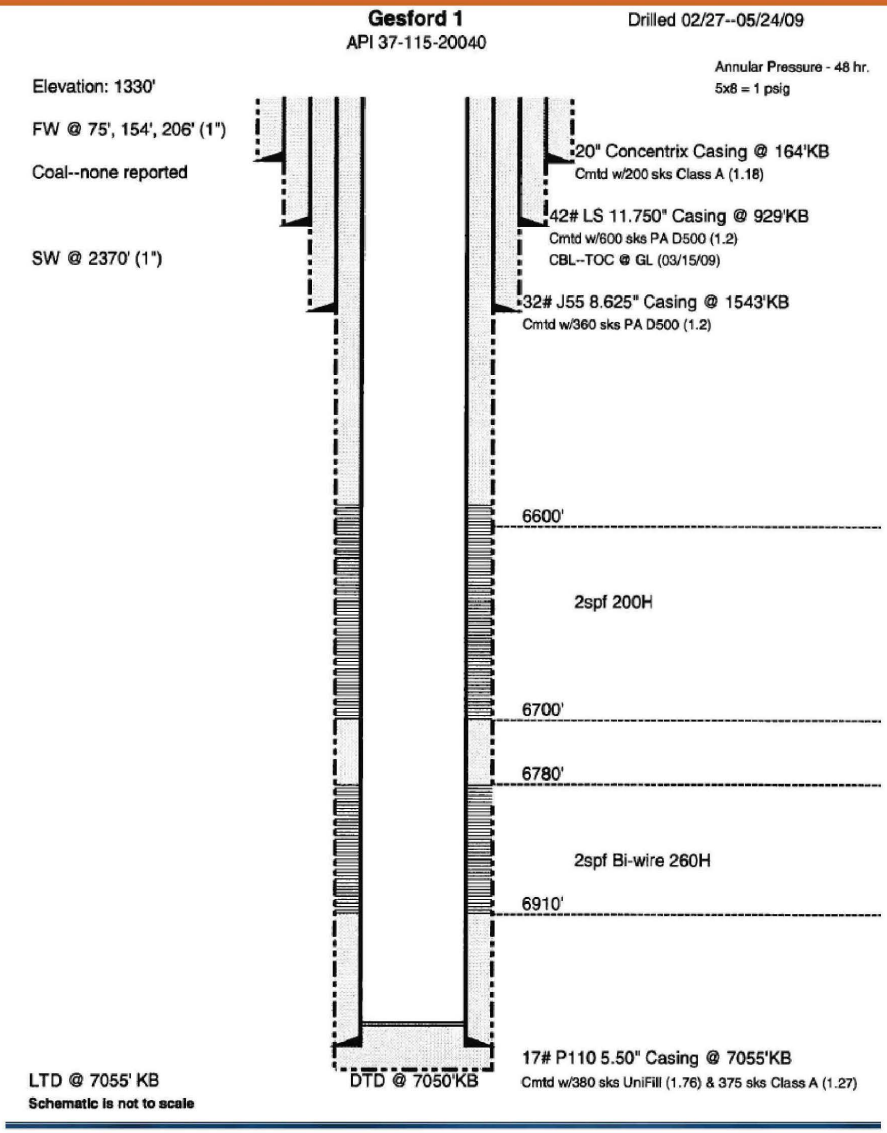
Water wells > 7 MG/L:

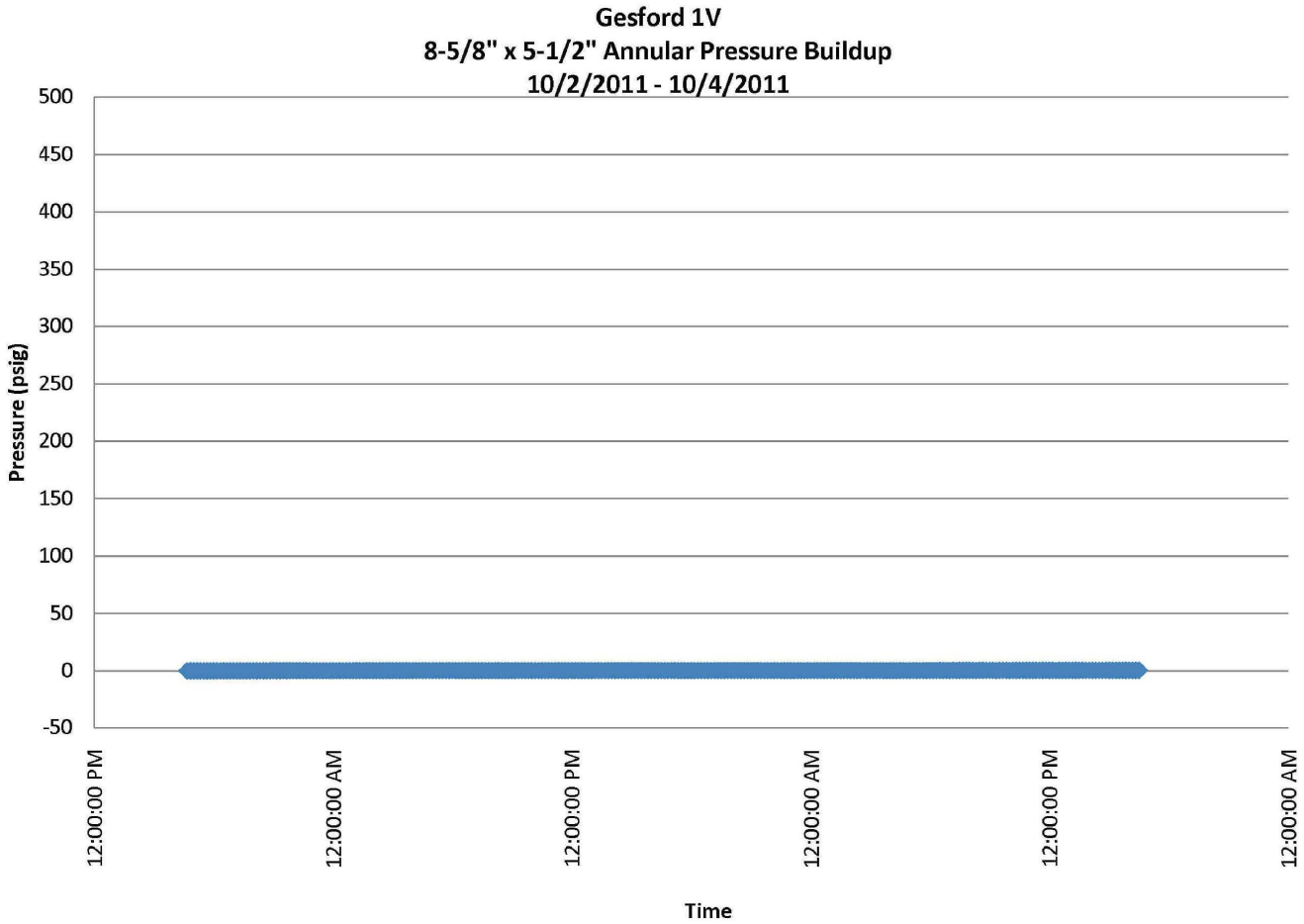
≤ 1000'	None
1000'-2500'	None

Plan Forward: Vent Annulus

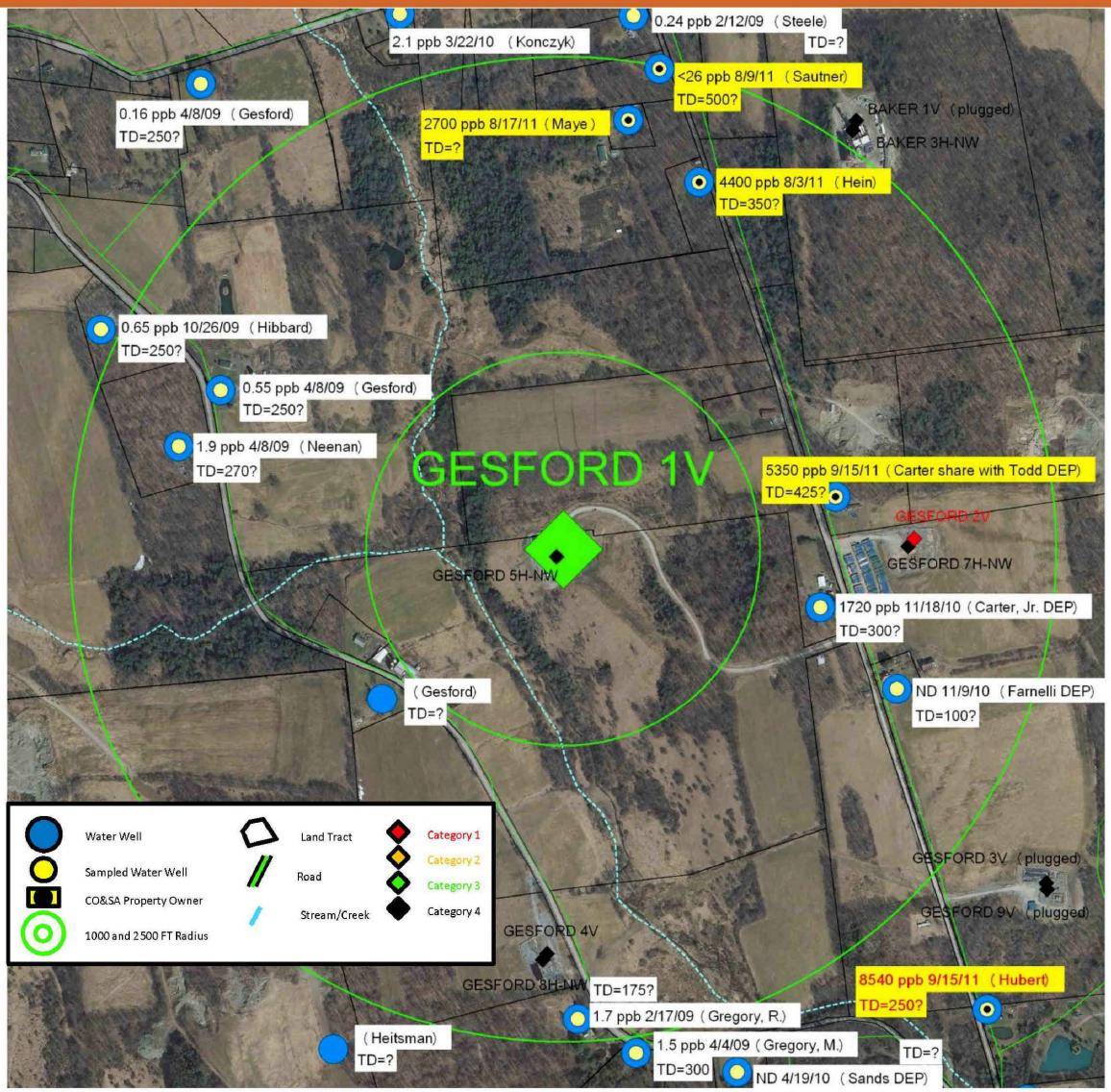
Comments:

Gesford 1V


Gesford 1
API 37-115-20040
Drilled 02/27--05/24/09
Annular Pressure - 48 hr.
5x8 = 1 psig
Elevation: 1330'
FW @ 75', 154', 206' (1")
Coal--none reported
SW @ 2370' (1")
20" Concentrix Casing @ 164'KB
Cmtd w/200 sks Class A (1.18)
42# LS 11.750" Casing @ 929'KB
Cmtd w/600 sks PA D500 (1.2)
CBL--TOC @ GL (03/15/09)
32# J55 8.625" Casing @ 1543'KB
Cmtd w/360 sks PA D500 (1.2)
6600'
2spf 200H
6700'
6780'
2spf Bi-wire 260H
6910'
17# P110 5.50" Casing @ 7055'KB
Cmtd w/380 sks UniFill (1.76) & 375 sks Class A (1.27)
LTD @ 7055' KB
DTD @ 7050'KB
Schematic is not to scale


Gesford 1V
8-5/8" x 5-1/2" Annular Pressure Buildup
10/2/2011 - 10/4/2011
Pressure (psig)
500
450
400
350
300
250
200
150
100
50
0
-50
12:00:00 PM
12:00:00 AM
12:00:00 PM
12:00:00 AM
12:00:00 PM
12:00:00 AM
Time

Gesford 1V


2.1 ppb 3/22/10 (Konczyk)
0.24 ppb 2/12/09 (Steele)
TD=?
<26 ppb 8/9/11 (Sautner)
TD=500?
0.16 ppb 4/8/09 (Gesford)
TD=250?
2700 ppb 8/17/11 (Maye)
TD=?
BAKER 1V (plugged)
BAKER 3H-NW
4400 ppb 8/3/11 (Hein)
TD=350?
0.65 ppb 10/26/09 (Hibbard)
TD=250?
0.55 ppb 4/8/09 (Gesford)
TD=250?
1.9 ppb 4/8/09 (Neenan)
TD=270?
GESFORD 1V
5350 ppb 9/15/11 (Carter share with Todd DEP)
TD=425?
GESFORD 2V
GESFORD 7H-NW
GESFORD 5H-NW
1720 ppb 11/18/10 (Carter, Jr. DEP)
TD=300?
(Gesford)
TD=?
ND 11/9/10 (Farnelli DEP)
TD=100?
Water Well
Sampled Water Well
CO&SA Property Owner
1000 and 2500 FT Radius
Land Tract
Road
Stream/Creek
Category 1
Category 2
Category 3
Category 4
GESFORD 3V (plugged)
GESFORD 9V (plugged)
GESFORD 4V
GESFORD 8H-NW
TD=175?
8540 ppb 9/15/11 (Hubert)
TD=250?
1.7 ppb 2/17/09 (Gregory, R.)
(Heitsman)
TD=?
1.5 ppb 4/4/09 (Gregory, M.)
TD=300
TD=?
ND 4/19/10 (Sands DEP)

Hubbard 1V

Gas Well: Hubbard 1V

Category: III

	Size	Depth	TOC	80% FW Gradient
Surface Pipe:	9-5/8	936	Surface	321
Intermediate Pipe:	7	1,643	Surface	566
Production:	4-1/2	6,964	5,614	-

	24 Hour		48 Hour	
	11/2010	10/2011	11/2010	10/2011
7 x 9 Annulus				
Pressure PSI:	0	0	0	0
Rate MCFD:	-	0	-	-

	24 Hour		48 Hour	
	11/2010	10/2011	11/2010	10/2011
4 x 7 Annulus:				
Pressure PSI:	9	0	8	0
Rate MCFD:	-	0	-	-

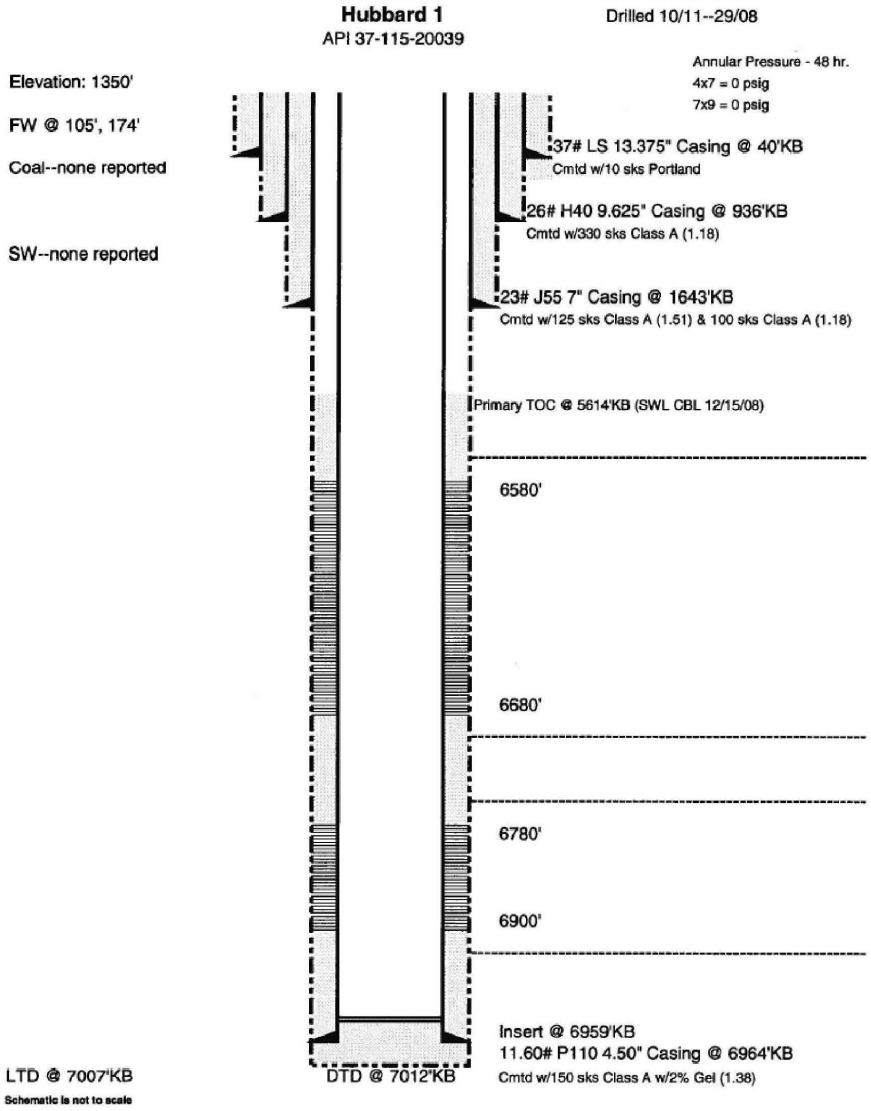
Water wells > 7 MG/L:

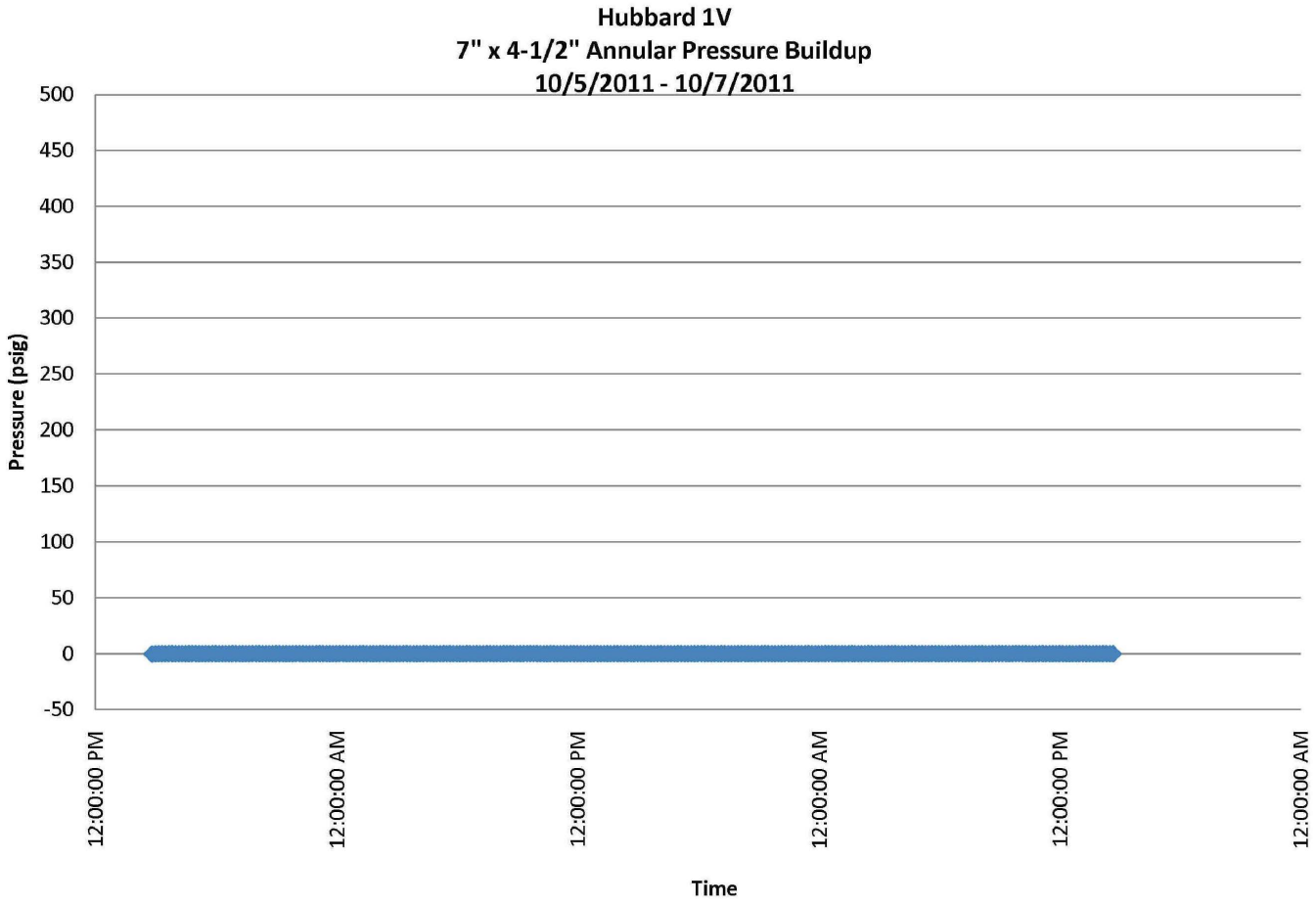
≤ 1000'	None
1000'-2500'	None

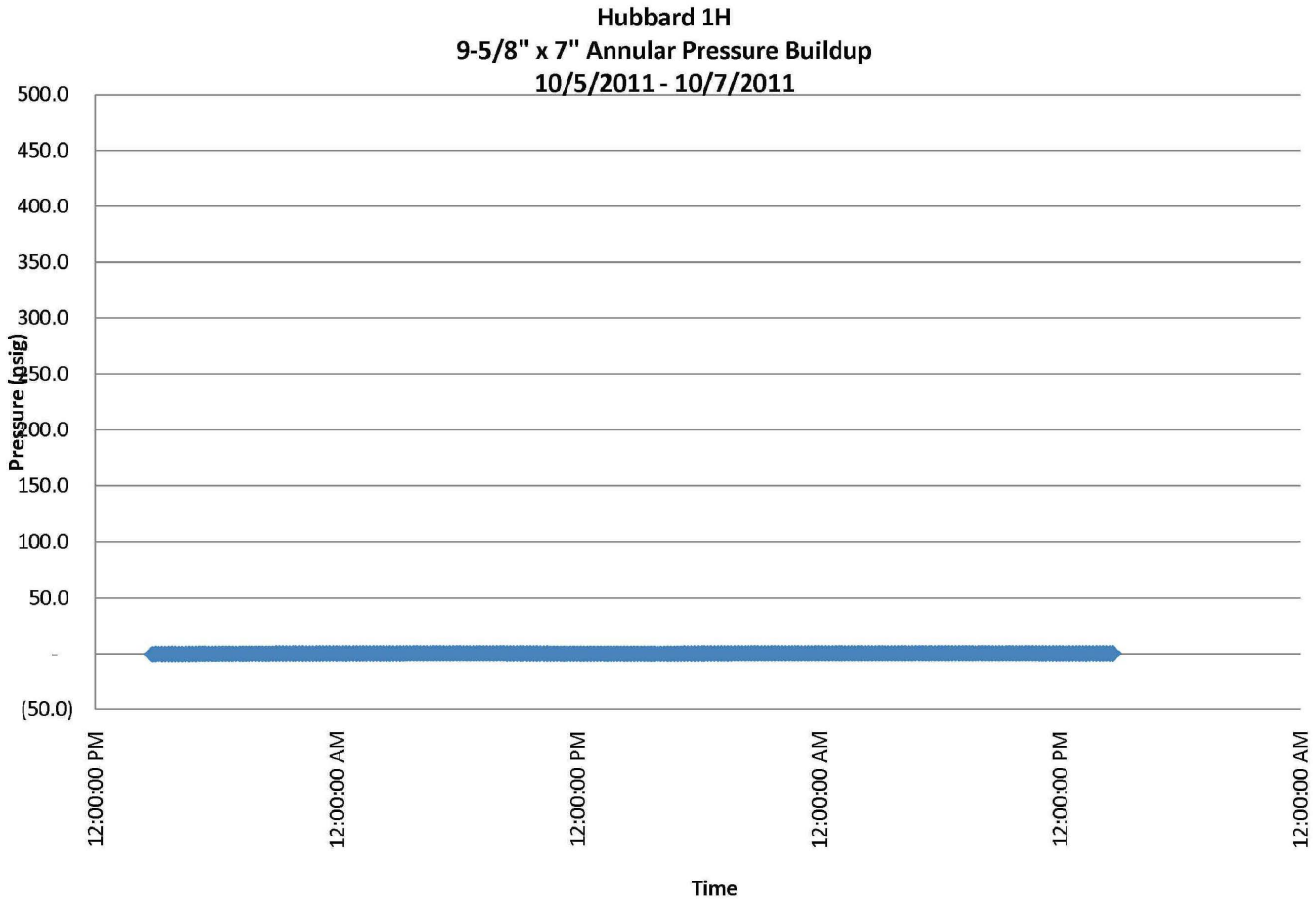
Plan Forward: Vent Annulus

Comments:

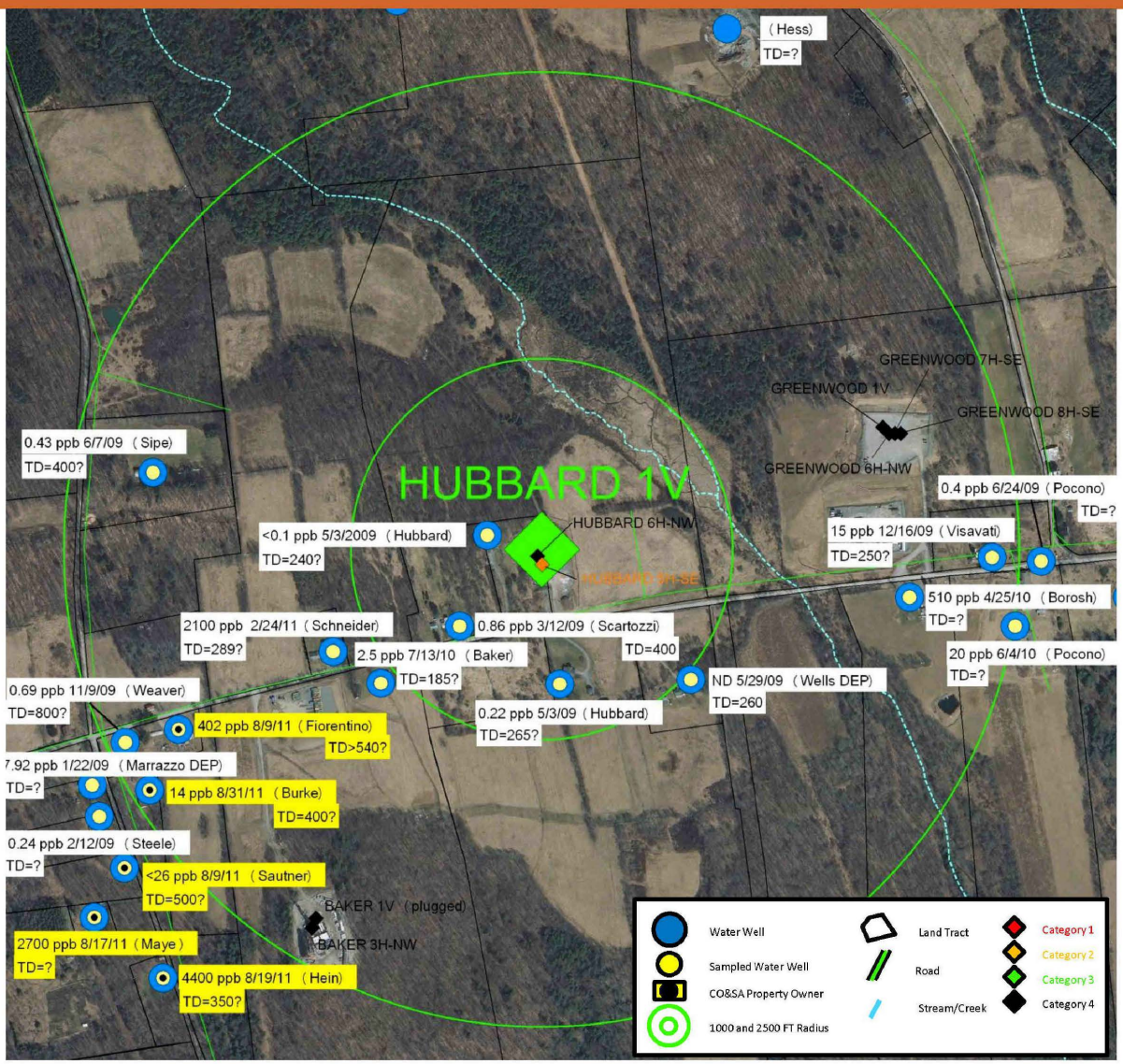
Hubbard 1V


Hubbard 1
API 37-115-20039
Drilled 10/11--29/08
Annular Pressure - 48 hr.
4x7 = 0 psig
7x9 = 0 psig
Elevation: 1350'
FW @ 105', 174'
Coal--none reported
SW--none reported
37# LS 13.375" Casing @ 40'KB
Cmtd w/10 sks Portland
26# H40 9.625" Casing @ 936'KB
Cmtd w/330 sks Class A (1.18)
23# J55 7" Casing @ 1643'KB
Cmtd w/125 sks Class A (1.51) & 100 sks Class A (1.18)
Primary TOC @ 5614'KB (SWL CBL 12/15/08)
6580'
6680'
6780'
6900'
Insert @ 6959'KB
11.60# P110 4.50" Casing @ 6964'KB
Cmtd w/150 sks Class A w/2% Gel (1.38)
LTD @ 7007'KB
DTD @ 7012'KB
Schematic is not to scale


Hubbard 1V
7" x 4-1/2" Annular Pressure Buildup
10/5/2011 - 10/7/2011
Pressure (psig)
500
450
400
350
300
250
200
150
100
50
0
-50
12:00:00 PM
12:00:00 AM
12:00:00 PM
12:00:00 AM
12:00:00 PM
12:00:00 AM
Time


Hubbard 1H
9-5/8" x 7" Annular Pressure Buildup
10/5/2011 - 10/7/2011
500.0
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
-
(50.0)
Pressure (psig)
12:00:00 PM
12:00:00 AM
12:00:00 PM
12:00:00 AM
12:00:00 PM
12:00:00 AM
Time

Hubbard 1V


(Hess)
TD=?
GREENWOOD 7H-SE
GREENWOOD 1V
GREENWOOD 8H-SE
GREENWOOD 6H-NW
0.43 ppb 6/7/09 (Sipe)
TD=400?
HUBBARD 1V
HUBBARD 6H-NW
HUBBARD 9H-SE
<0.1 ppb 5/3/2009 (Hubbard)
TD=240?
0.4 ppb 6/24/09 (Pocono)
TD=?
15 ppb 12/16/09 (Visavati)
TD=250?
510 ppb 4/25/10 (Borosh)
TD=?
2100 ppb 2/24/11 (Schneider)
TD=289?
0.86 ppb 3/12/09 (Scartozzi)
TD=400
2.5 ppb 7/13/10 (Baker)
TD=185?
20 ppb 6/4/10 (Pocono)
TD=?
ND 5/29/09 (Wells DEP)
TD=260
0.69 ppb 11/9/09 (Weaver)
TD=800?
402 ppb 8/9/11 (Fiorentino)
TD>540?
0.22 ppb 5/3/09 (Hubbard)
TD=265?
7.92 ppb 1/22/09 (Marrazzo DEP)
TD=?
14 ppb 8/31/11 (Burke)
TD=400?
0.24 ppb 2/12/09 (Steele)
TD=?
<26 ppb 8/9/11 (Sautner)
TD=500?
BAKER 1V (plugged)
BAKER 3H-NW
2700 ppb 8/17/11 (Maye)
TD=?
4400 ppb 8/19/11 (Hein)
TD=350?
Water Well
Sampled Water Well
CO&SA Property Owner
1000 and 2500 FT Radius
Land Tract
Road
Stream/Creek
Category 1
Category 2
Category 3
Category 4

Kelley 1H

Gas Well: Kelley, P. 1H

Category: III

	Size	Depth	TOC	80% FW Gradient
Surface Pipe:	9-5/8	1,544	Surface	535
Intermediate Pipe:	None	-	-	-
Production:	5-1/2	10,500	400	-

	24 Hour		48 Hour	
7 x 9 Annulus				
Pressure PSI:	None			
Rate MCFD:				

	24 Hour		48 Hour	
	12/2010	10/2011	12/2010	10/2011
5 x 9 Annulus:				
Pressure PSI:	168	117	300	169
Rate MCFD:	-	0	-	-

Water wells > 7 MG/L:

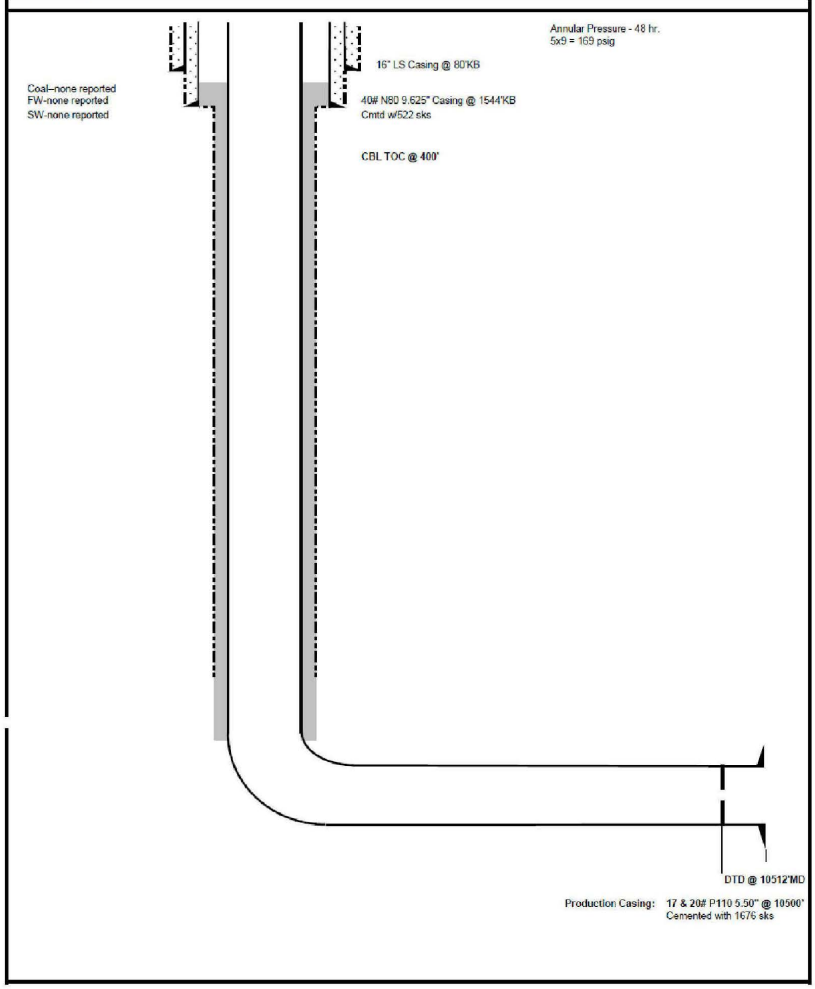
≤ 1000'	None
1000'-2500'	None

Plan Forward: Vent Annulus

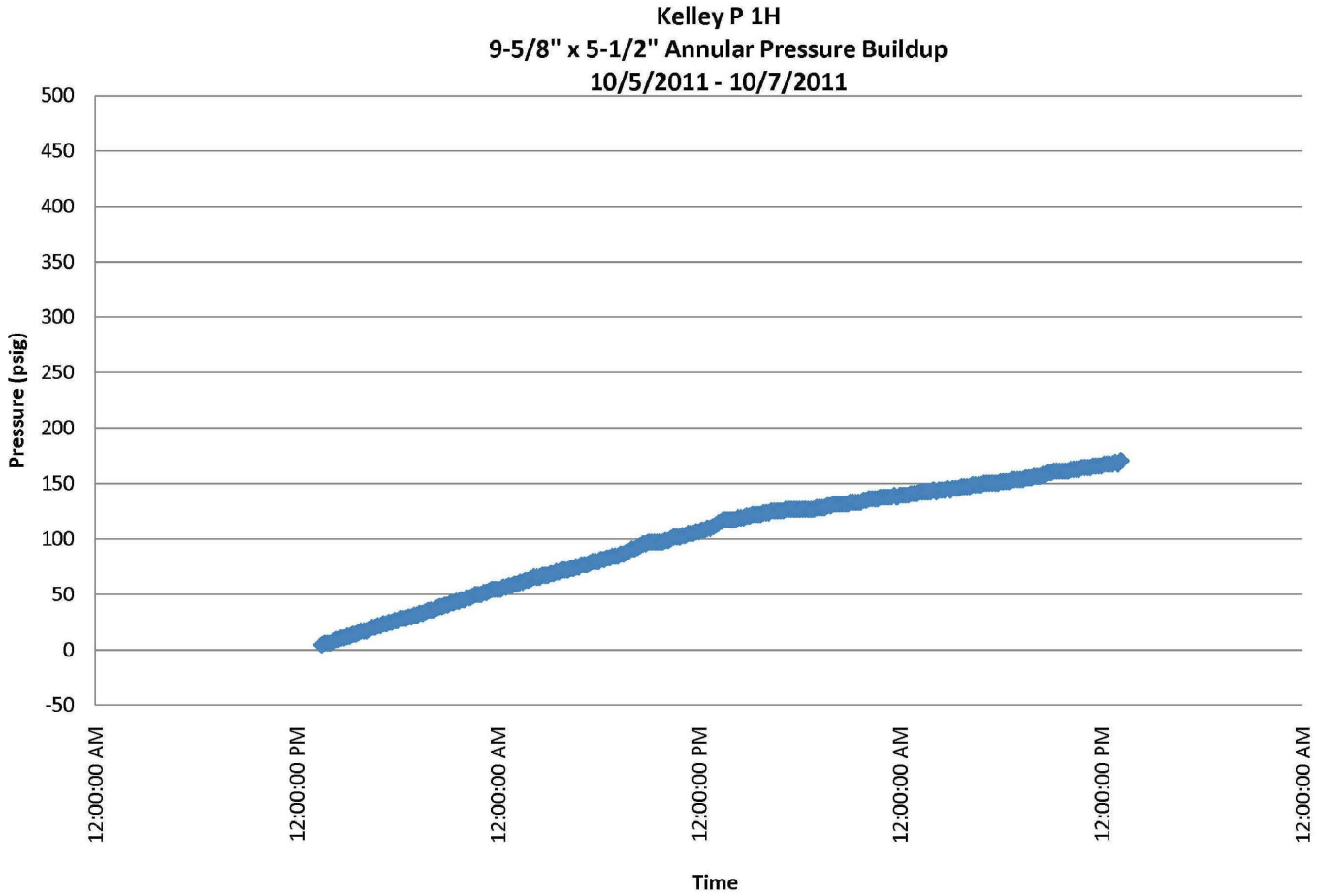
Comments: Well is not completed.

Kelley 1H - SE

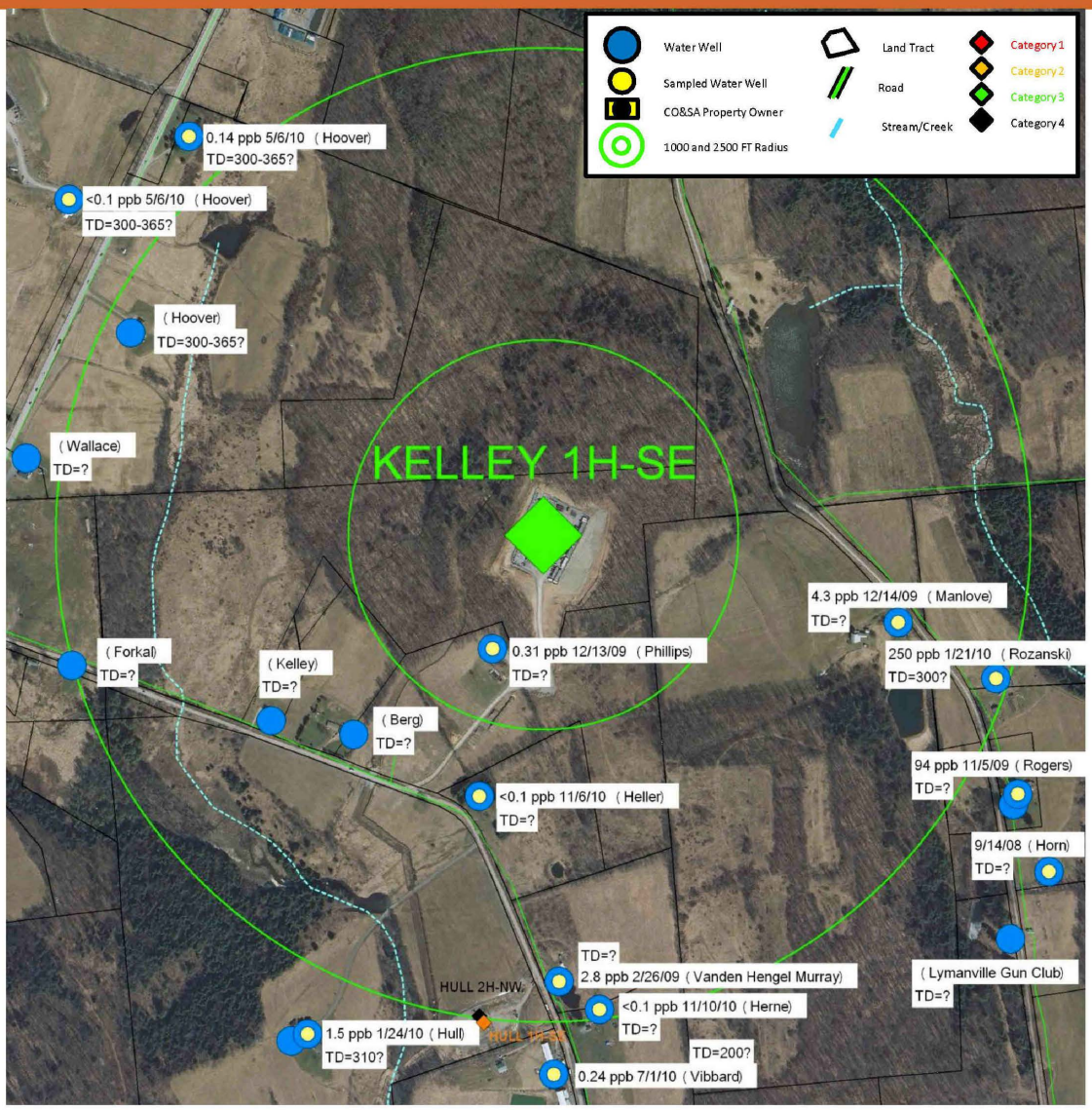
Well Name:	P.Kelley 1H-SE	**County, State:**	**Susquehanna Co. PA**
API Number:	37-115-20196	**TIL Date:**	
AFE Number:		**TIL Rate:**	
Drilling Rig:		**Surf. Latitude:**	
Drilled:	03/15-31/10, 04/01-08/10	**Surf. Longitude:**	
Completed:	Not Completed	**KB Elevation:**	1480'
Final Open Flow:		**Ground Elevation:**	1497'



Kelley 1H - SE


Kelley P 1H
9-5/8" x 5-1/2" Annular Pressure Buildup
10/5/2011 - 10/7/2011
Pressure (psig)
500
450
400
350
300
250
200
150
100
50
0
-50
12:00:00 AM
12:00:00 PM
12:00:00 AM
12:00:00 PM
12:00:00 AM
12:00:00 PM
12:00:00 AM
Time

Kelley 1H - SE


Water Well
Sampled Water Well
CO&SA Property Owner
1000 and 2500 FT Radius
Land Tract
Road
Stream/Creek
Category 1
Category 2
Category 3
Category 4
0.14 ppb 5/6/10 (Hoover)
TD=300-365?
<0.1 ppb 5/6/10 (Hoover)
TD=300-365?
(Hoover)
TD=300-365?
(Wallace)
TD=?
KELLEY 1H-SE
4.3 ppb 12/14/09 (Manlove)
TD=?
250 ppb 1/21/10 (Rozanski)
TD=300?
(Forkal)
TD=?
(Kelley)
TD=?
0.31 ppb 12/13/09 (Phillips)
TD=?
(Berg)
TD=?
94 ppb 11/5/09 (Rogers)
TD=?
<0.1 ppb 11/6/10 (Heller)
TD=?
9/14/08 (Horn)
TD=?
TD=?
2.8 ppb 2/26/09 (Vanden Hengel Murray)
(Lymanville Gun Club)
TD=?
HULL 2H-NW
<0.1 ppb 11/10/10 (Herne)
TD=?
1.5 ppb 1/24/10 (Hull)
TD=310?
HULL 1H-SE
TD=200?
0.24 ppb 7/1/10 (Vibbard)

Ratzel 1H

Gas Well: Ratzel 1H

Category: III

	Size	Depth	TOC	80% FW Gradient
Surface Pipe:	9-5/8	868	Surface	301
Intermediate Pipe:	7	1,524	Surface	528
Production:	4-1/2	9,539	2,650	-

	24 Hour		48 Hour	
	11/2010	9/2011	11/2010	9/2011
7 x 9 Annulus				
Pressure PSI:	0	0	0	0
Rate MCFD:	-	0	-	-

	24 Hour		48 Hour	
	11/2010	9/2011	11/2010	9/2011
4 x 7 Annulus:				
Pressure PSI:	160	69	225	59
Rate MCFD:	-	0	-	-

Water wells > 7 MG/L:

≤ 1000' Roos, Salsman, F. Kinner, H. Kinner

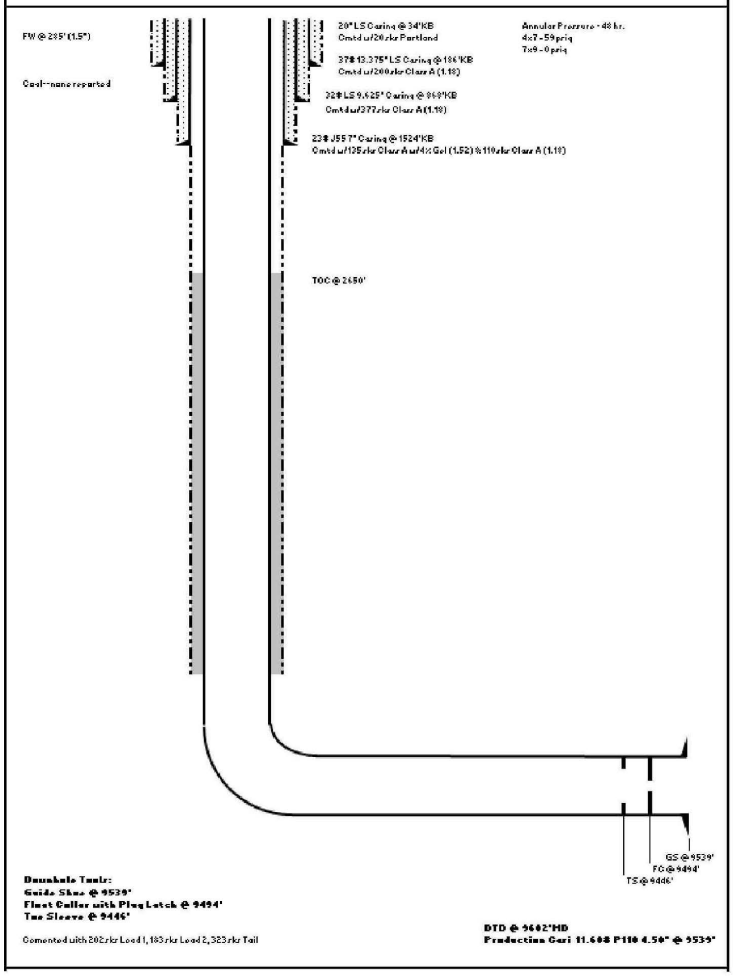
1000'-2500' Stover

Plan Forward: Vent Annulus

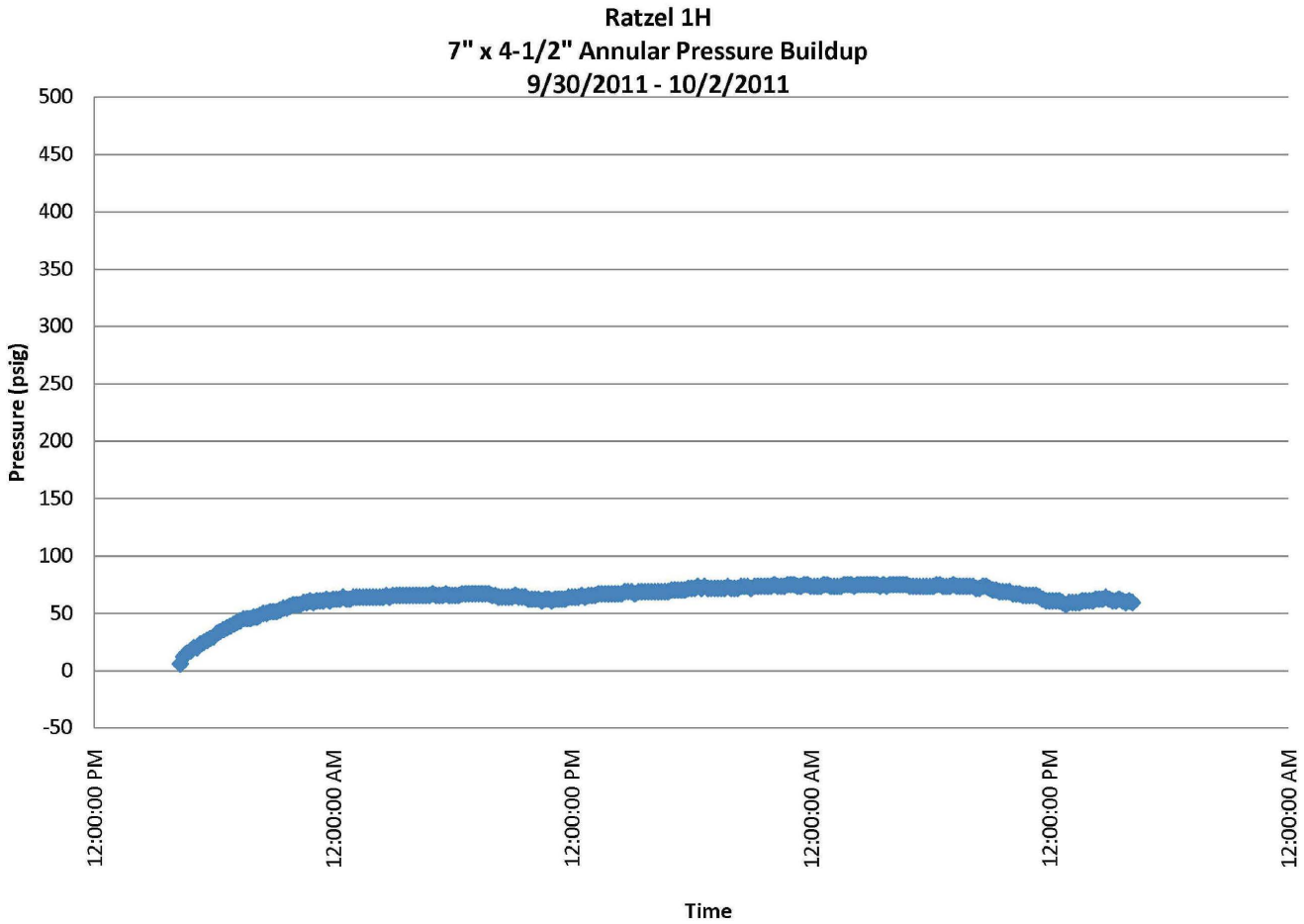
Comments:

Ratzel 1H

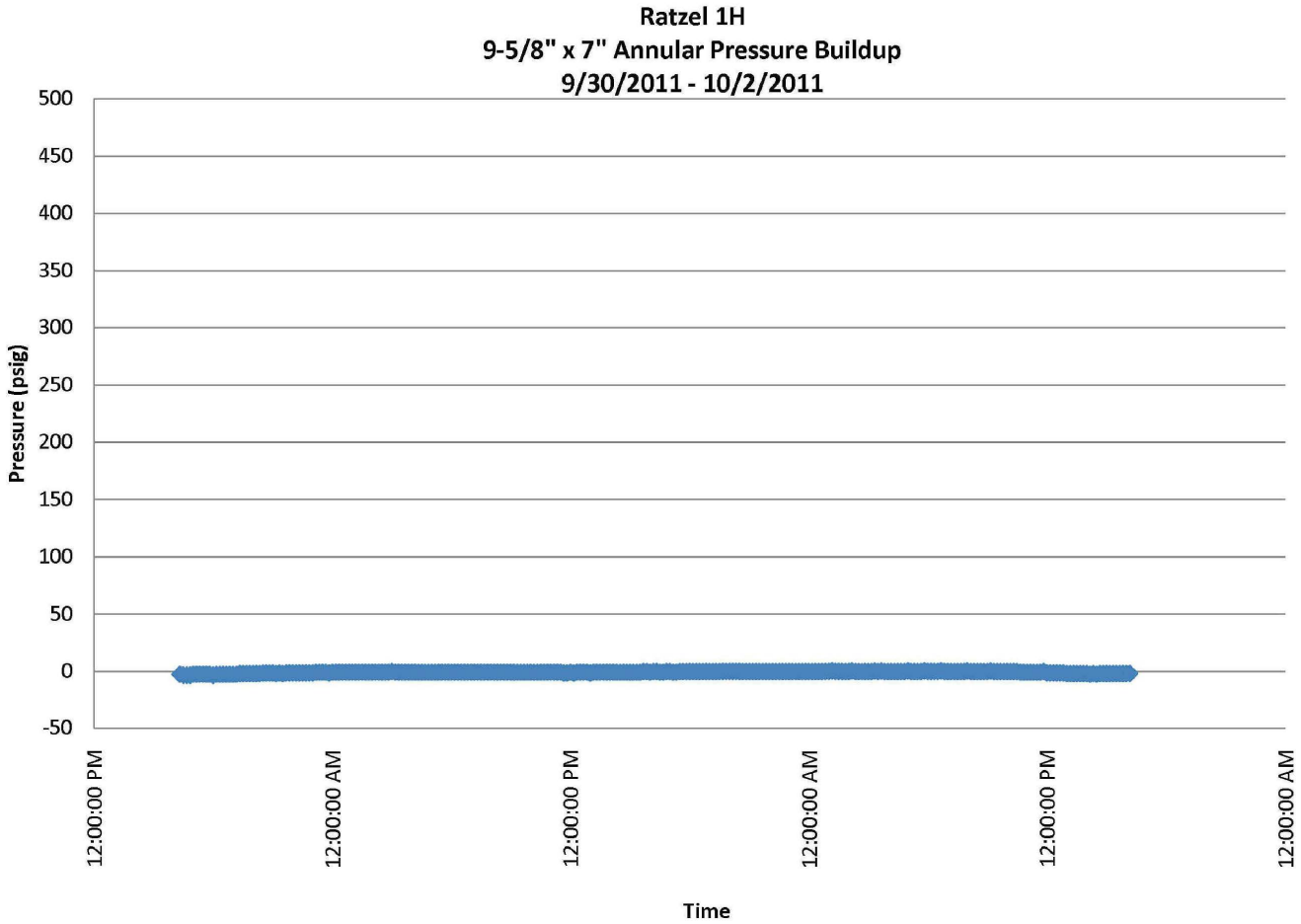
Well Name:	Ratzel 1H	**County, State:**	**Susquehanna Co. PA**
API Number:	37-115-20047	**TIL Date:**	
AFE Number:		**TIL Rate:**	
Drilling Rig:		**Surf. Latitude:**	
Drilled:	11/03--23/08, 01/20--04/08/09	**Surf. Longitude:**	
Completed:		**KB Elevation:**	1150'
Final Open Flow:		**Ground Elevation:**	1140'



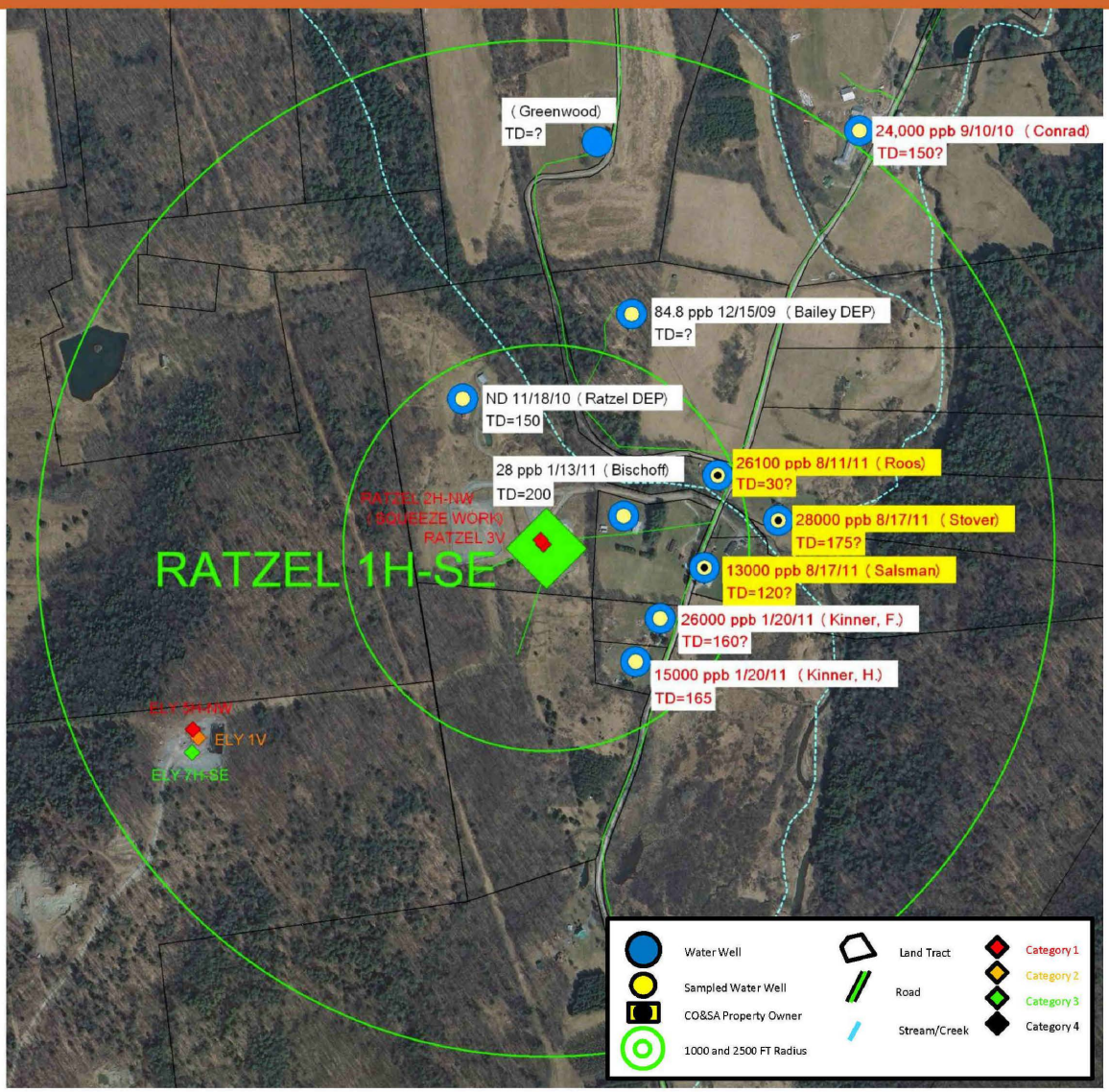
Ratzel 1H


Ratzel 1H
7" x 4-1/2" Annular Pressure Buildup
9/30/2011 - 10/2/2011
Pressure (psig)
500
450
400
350
300
250
200
150
100
50
0
-50
12:00:00 PM
12:00:00 AM
12:00:00 PM
12:00:00 AM
12:00:00 PM
12:00:00 AM
Time

Ratzel 1H


Ratzel 1H
9-5/8" x 7" Annular Pressure Buildup
9/30/2011 - 10/2/2011
Pressure (psig)
500
450
400
350
300
250
200
150
100
50
0
-50
12:00:00 PM
12:00:00 AM
12:00:00 PM
12:00:00 AM
12:00:00 PM
12:00:00 AM
Time

Ratzel 1H - SE


(Greenwood)
TD=?
24,000 ppb 9/10/10 (Conrad)
TD=150?
84.8 ppb 12/15/09 (Bailey DEP)
TD=?
ND 11/18/10 (Ratzel DEP)
TD=150
28 ppb 1/13/11 (Bischoff)
TD=200
26100 ppb 8/11/11 (Roos)
TD=30?
28000 ppb 8/17/11 (Stover)
TD=175?
13000 ppb 8/17/11 (Salsman)
TD=120?
26000 ppb 1/20/11 (Kinner, F.)
TD=160?
15000 ppb 1/20/11 (Kinner, H.)
TD=165
RATZEL 2H-NW
(SQUEEZE WORK)
RATZEL 3V
RATZEL 1H-SE
ELY 1V
ELY 7H-SE
Water Well
Sampled Water Well
CO&SA Property Owner
1000 and 2500 FT Radius
Land Tract
Road
Stream/Creek
Category 1
Category 2
Category 3
Category 4

Teel 2V

Gas Well: Teel 2V

Category: III

	Size	Depth	TOC	80% FW Gradient
Surface Pipe:	13-3/8	485	Surface	168
Intermediate Pipe:	9-5/8	1,460	Surface	506
Production:	4-1/2	7,238	5,880	-

	24 Hour		48 Hour	
9 x 13 Annulus				
Pressure PSI:	N/A			
Rate MCFD:				

	24 Hour		48 Hour	
	12/2010	10/2011	12/2010	10/2011
4 x 9 Annulus:				
Pressure PSI:	8	95	10	109
Rate MCFD:	-	0.4	-	-

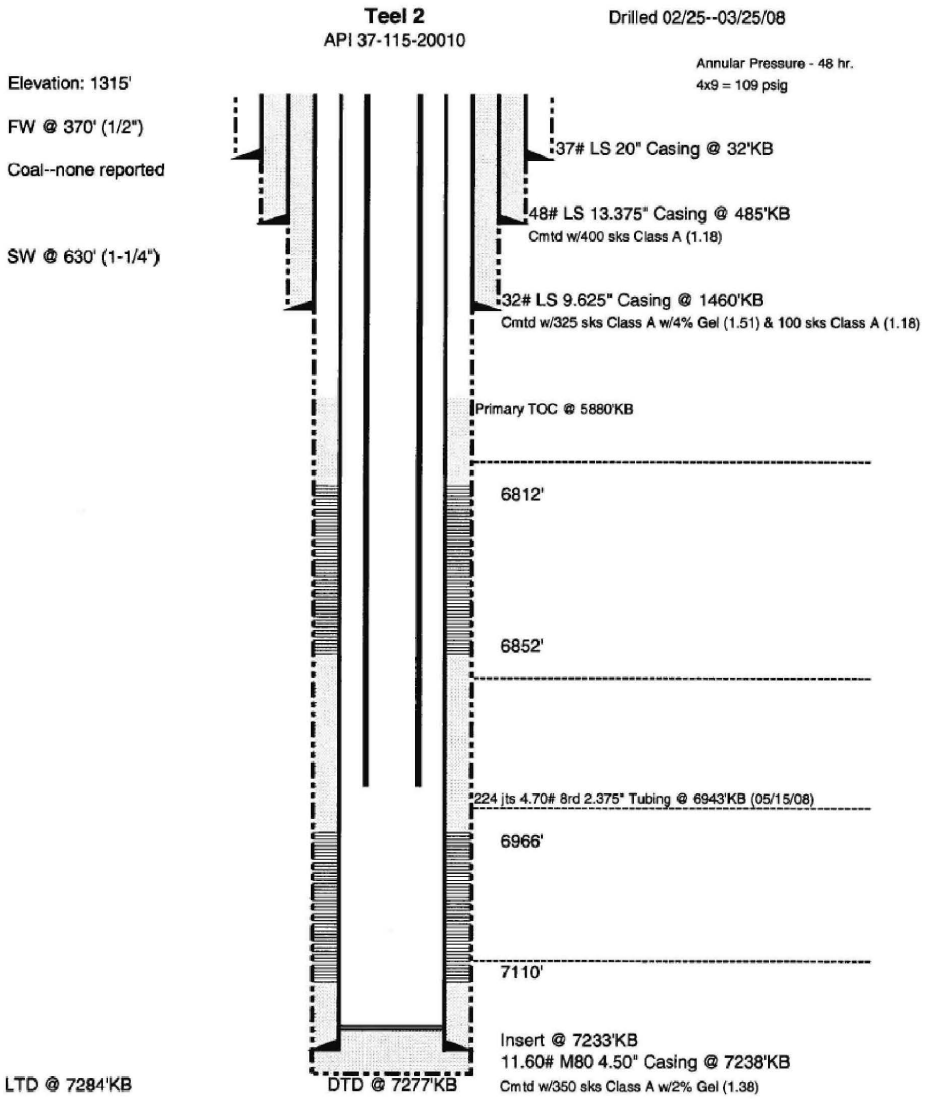
Water wells > 7 MG/L:

≤ 1000'	None
1000'-2500'	None

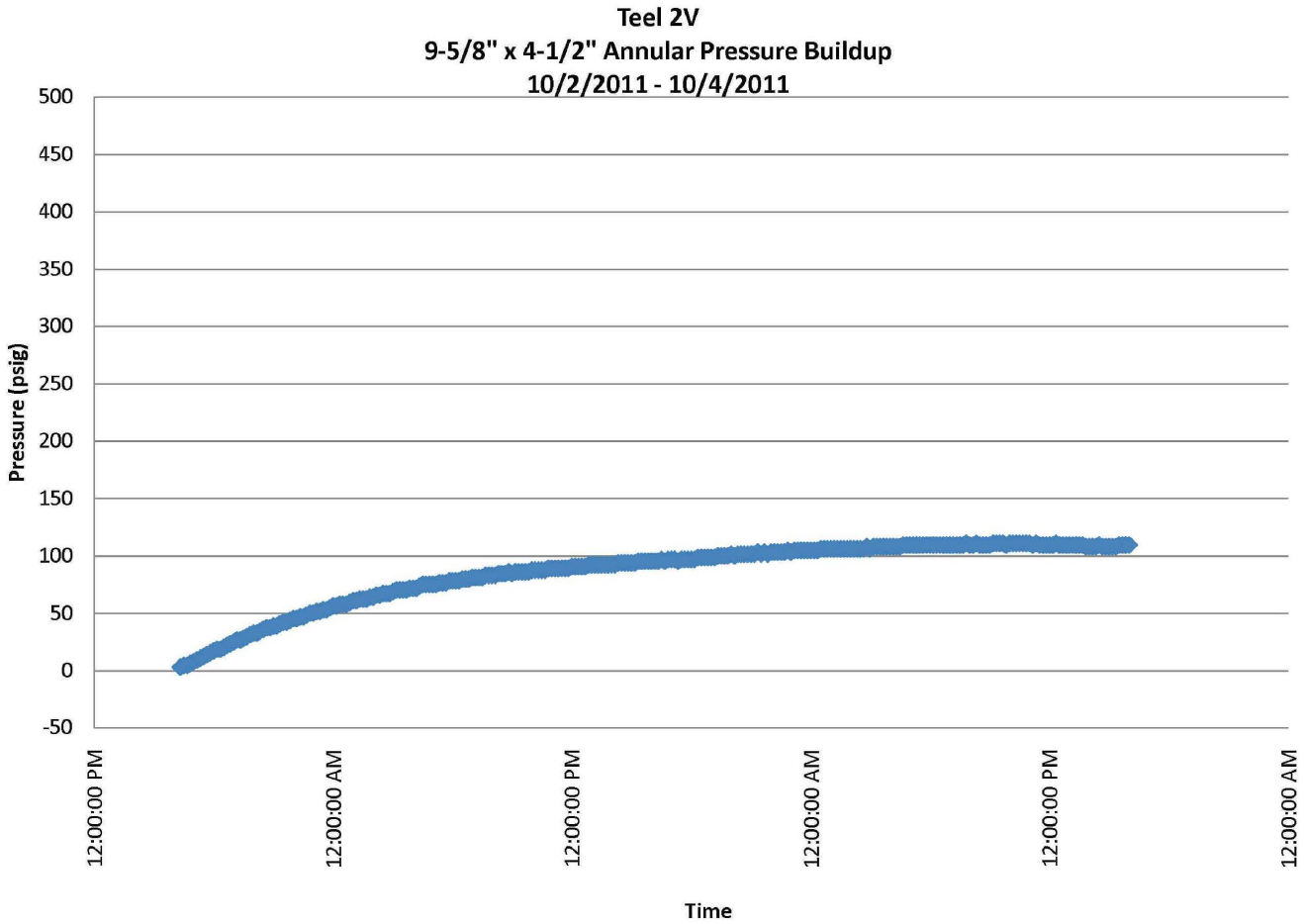
Plan Forward: Vent Annulus

Comments:

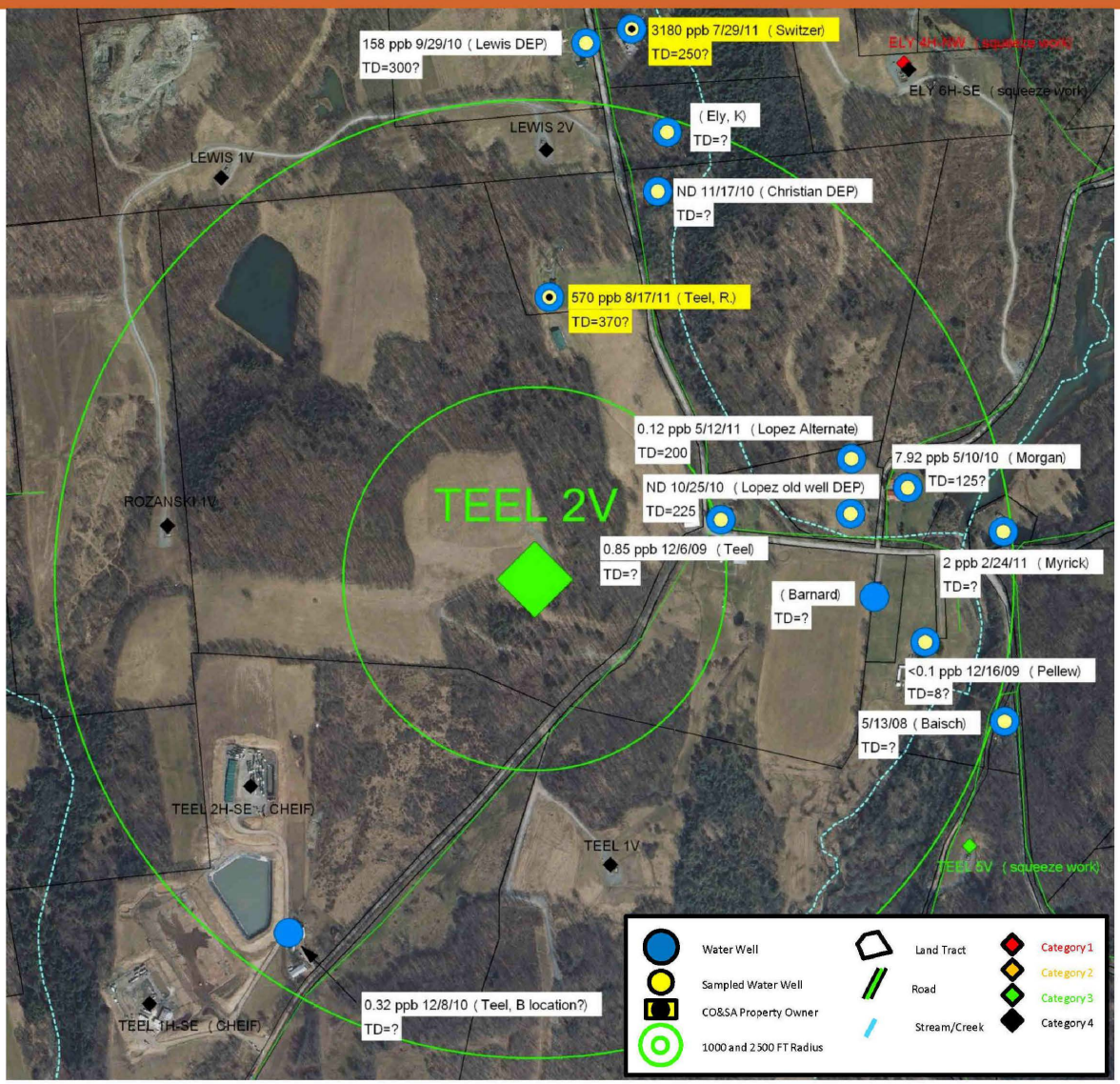
Teel 2V


Teel 2
API 37-115-20010
Drilled 02/25--03/25/08
Annular Pressure - 48 hr.
4x9 = 109 psig
Elevation: 1315'
FW @ 370' (1/2")
Coal--none reported
SW @ 630' (1-1/4")
37# LS 20" Casing @ 32'KB
48# LS 13.375" Casing @ 485'KB
Cmtd w/400 sks Class A (1.18)
32# LS 9.625" Casing @ 1460'KB
Cmtd w/325 sks Class A w/4% Gel (1.51) & 100 sks Class A (1.18)
Primary TOC @ 5880'KB
6812'
6852'
224 jts 4.70# 8rd 2.375" Tubing @ 6943'KB (05/15/08)
6966'
7110'
Insert @ 7233'KB
11.60# M80 4.50" Casing @ 7238'KB
Cmtd w/350 sks Class A w/2% Gel (1.38)
LTD @ 7284'KB
DTD @ 7277'KB

Teel 2V


Teel 2V
9-5/8" x 4-1/2" Annular Pressure Buildup
10/2/2011 - 10/4/2011
Pressure (psig)
500
450
400
350
300
250
200
150
100
50
0
-50
12:00:00 PM
12:00:00 AM
12:00:00 PM
12:00:00 AM
12:00:00 PM
12:00:00 AM
Time

Teel 2V


158 ppb 9/29/10 (Lewis DEP)
TD=300?
3180 ppb 7/29/11 (Switzer)
TD=250?
ELY 4H-RW (squeeze work)
ELY 6H-SE (squeeze work)
(Ely, K)
TD=?
LEWIS 2V
LEWIS 1V
ND 11/17/10 (Christian DEP)
TD=?
570 ppb 8/17/11 (Teel, R.)
TD=370?
0.12 ppb 5/12/11 (Lopez Alternate)
TD=200
7.92 ppb 5/10/10 (Morgan)
TD=125?
ND 10/25/10 (Lopez old well DEP)
TD=225
TEEL 2V
ROZANSKI 1V
0.85 ppb 12/6/09 (Teel)
TD=?
2 ppb 2/24/11 (Myrick)
TD=?
(Barnard)
TD=?
<0.1 ppb 12/16/09 (Pellew)
TD=8?
5/13/08 (Baisch)
TD=?
TEEL 2H-SE (CHEIF)
TEEL 1V
TEEL 5V (squeeze work)
TEEL 1H-SE (CHEIF)
0.32 ppb 12/8/10 (Teel, B location?)
TD=?
Water Well
Sampled Water Well
CO&SA Property Owner
1000 and 2500 FT Radius
Land Tract
Road
Stream/Creek
Category 1
Category 2
Category 3
Category 4

Teel 5V

Gas Well: Teel 5V

Category: III

	Size	Depth	TOC	80% FW Gradient
Surface Pipe:	9-5/8	807	Surface	276
Intermediate Pipe:	7	1,518	Surface	526
Production:	4-1/2	7,115	Surface	-

	24 Hour		48 Hour	
	2/2011	10/2011	2/2011	10/2011
7 x 9 Annulus				
Pressure PSI:	0	0	0	0
Rate MCFD:				

	24 Hour		48 Hour	
	2/2011	10/2011	2/2011	10/2011
4 x 7 Annulus:				
Pressure PSI:	0	0	0	3
Rate MCFD:	-	0	-	-

Water wells > 7 MG/L:

≤ 1000'	None
1000'-2500'	None

Plan Forward: Vent annulus.

Comments: Squeezed cement in 4-1/2 annulus. 2/14/2011

Teel 5V

Teel 5

API 37-115-20024

Drilled 05/23--06/10/08

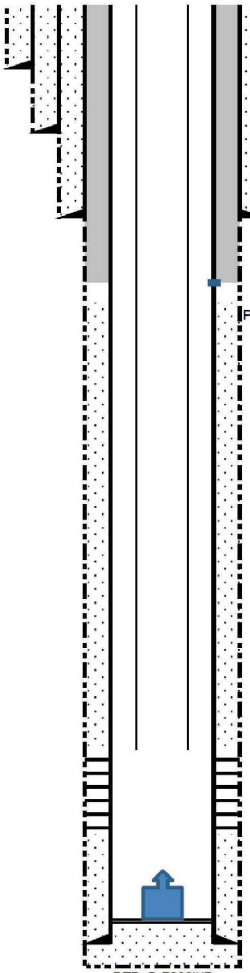
Annular Pressure - 48 hr.
4x7 = 3 psig
7x9 = 0 psig

Elevation: 1070'

FW @ 80', 740'

Coal--none reported

SW--none reported



37# H40 13.375" Casing @ 38'KB
Grouted w/40 sks Portland

26# H40 9.625" Casing @ 807'KB
Cmtd w/300 sks Class A (1.18)(circ to surface)

19# LS 7" Casing @ 1518'KB
w/135 sks Cl A w/4% Gel (1.51) & 115 sks Cl A (1.18)
(circ to surface)

Sqz perfs 8H/4600-4602' w/435 sx (circulated to surface)
Primary TOC @ 4750'KB (SLB CBL 07/02/08)

2 3/8" EUE tubing @ 6873' KB (216 jts)

292H/6870-7015'

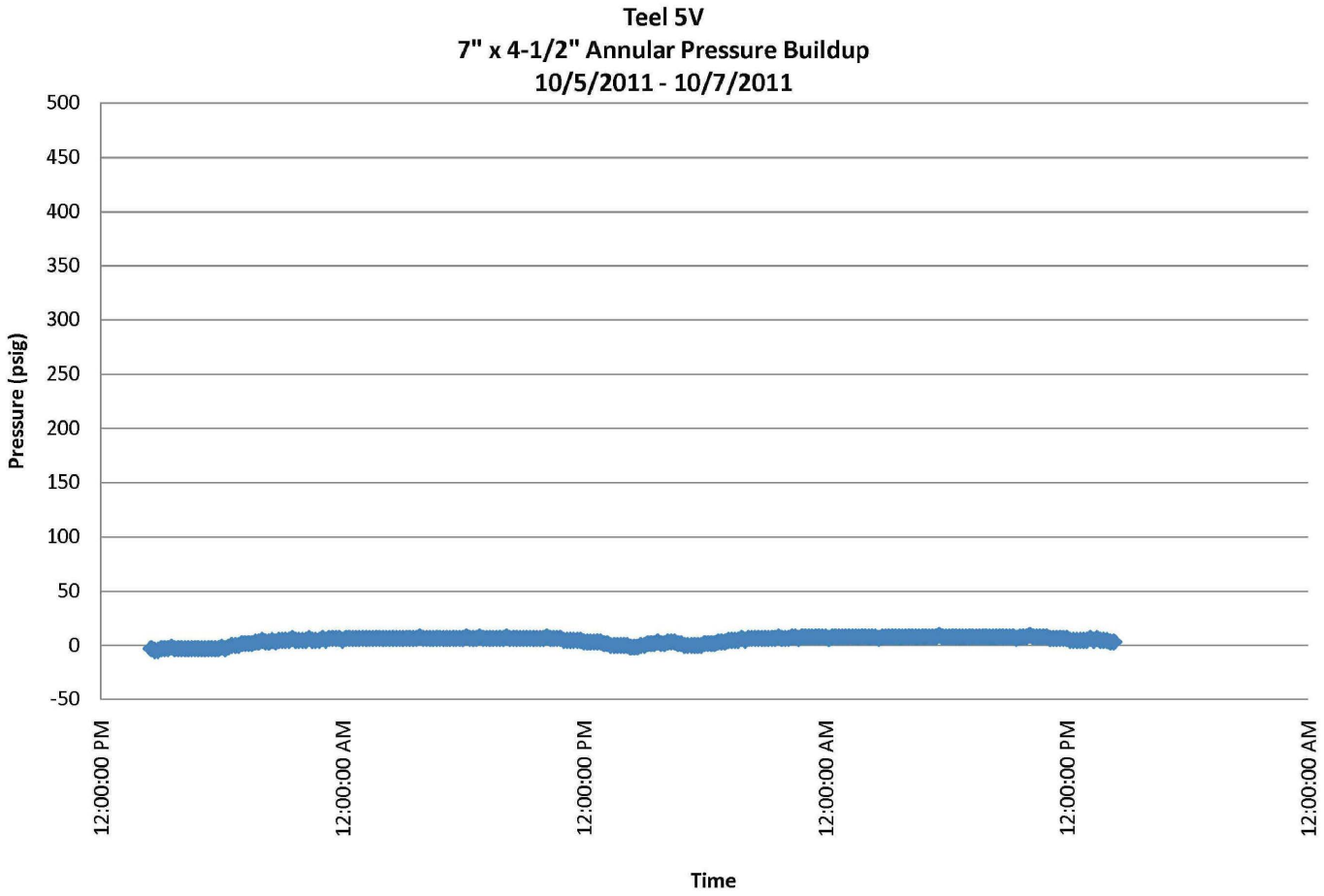
Pump off sub and bit on btm of hole

Insert @ 7074'KB
Casing @ 11.60# P110 4.50" Casing @ 7115'KB
Cmtd w/200 sks Class A w/2% Gel (1.38)

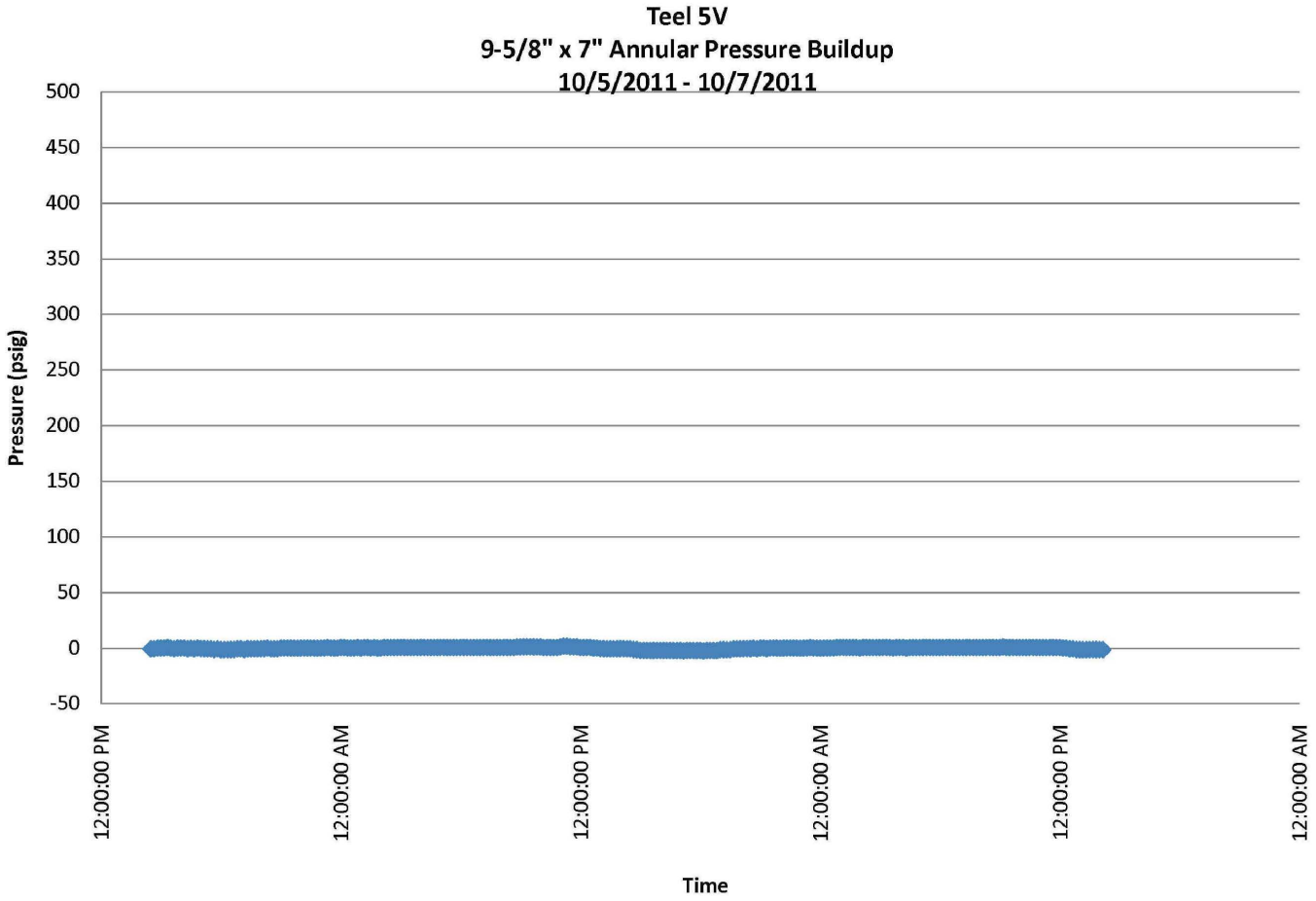
LTD @ 7164'KB

DTD @ 7200'KB

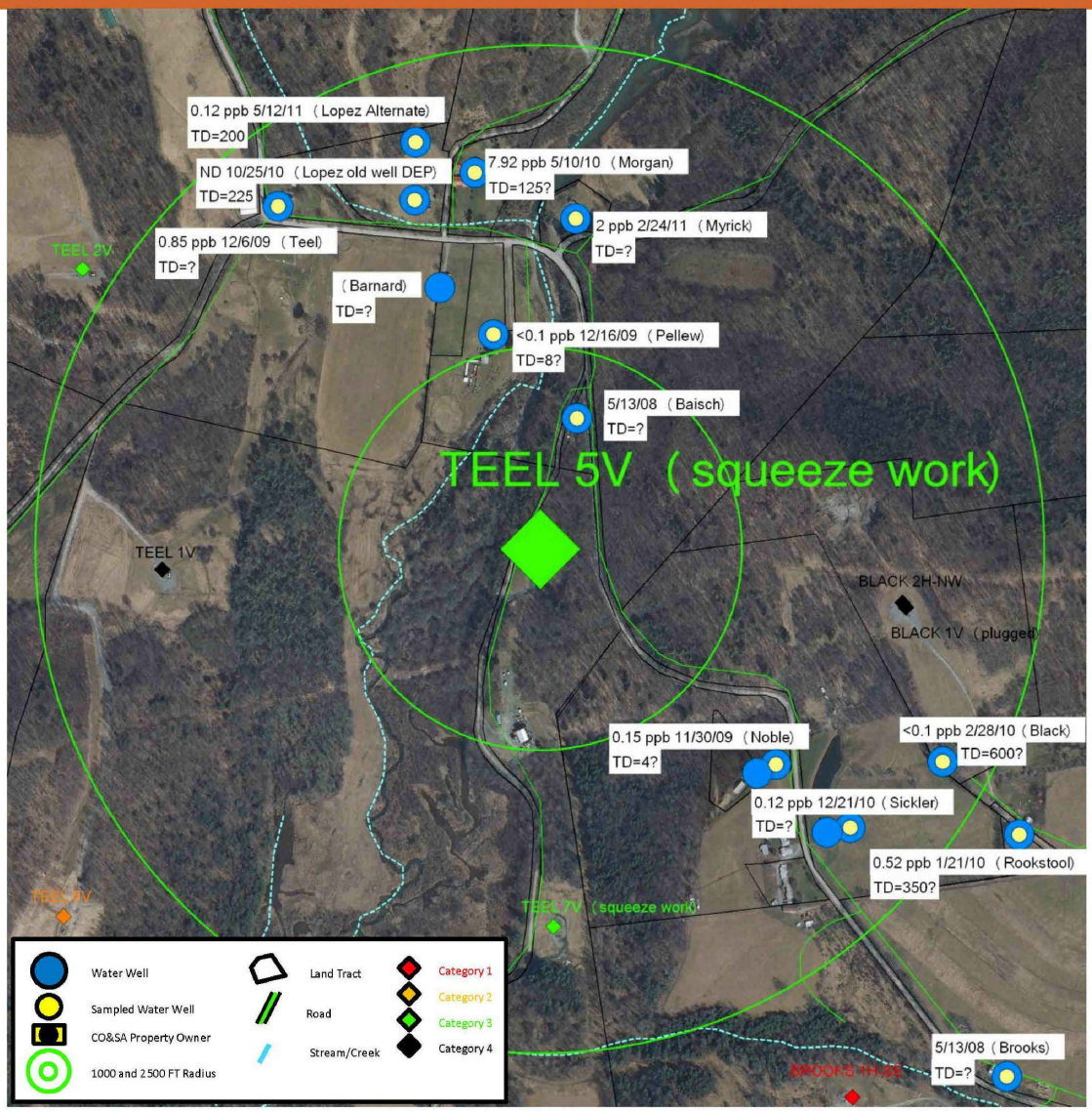
Teel 5V


Teel 5V
7" x 4-1/2" Annular Pressure Buildup
10/5/2011 - 10/7/2011
Pressure (psig)
500
450
400
350
300
250
200
150
100
50
0
-50
12:00:00 PM
12:00:00 AM
12:00:00 PM
12:00:00 AM
12:00:00 PM
12:00:00 AM
Time

Teel 5V


Teel 5V
9-5/8" x 7" Annular Pressure Buildup
10/5/2011 - 10/7/2011
Pressure (psig)
500
450
400
350
300
250
200
150
100
50
0
-50
12:00:00 PM
12:00:00 AM
12:00:00 PM
12:00:00 AM
12:00:00 PM
12:00:00 AM
Time

Teel 5V


0.12 ppb 5/12/11 (Lopez Alternate)
TD=200
ND 10/25/10 (Lopez old well DEP)
TD=225
7.92 ppb 5/10/10 (Morgan)
TD=125?
2 ppb 2/24/11 (Myrick)
TD=?
0.85 ppb 12/6/09 (Teel)
TD=?
TEEL 2V
(Barnard)
TD=?
<0.1 ppb 12/16/09 (Pellew)
TD=8?
5/13/08 (Baisch)
TD=?
TEEL 5V (squeeze work)
TEEL 1V
BLACK 2H-NW
BLACK 1V (plugged)
0.15 ppb 11/30/09 (Noble)
TD=4?
<0.1 ppb 2/28/10 (Black)
TD=600?
0.12 ppb 12/21/10 (Sickler)
TD=?
0.52 ppb 1/21/10 (Rookstool)
TD=350?
TEEL 7V (squeeze work)
5/13/08 (Brooks)
TD=?
Water Well
Sampled Water Well
CO&SA Property Owner
1000 and 2500 FT Radius
Land Tract
Road
Stream/Creek
Category 1
Category 2
Category 3
Category 4

Teel 7V

Gas Well: Teel 7V

Category: III

	Size	Depth	TOC	80% FW Gradient
Surface Pipe:	9-5/8	358	Surface	124
Intermediate Pipe:	7	1,496	Surface	518
Production:	4-1/2	7,118	Surface	-

	24 Hour		48 Hour	
	2/2010	10/2011	2/2010	10/2011
7 x 9 Annulus				
Pressure PSI:	0	175	0	229
Rate MCFD:	-	0		-

	24 Hour		48 Hour	
	2/2011	10/2011	2/2011	10/2011
4 x 7 Annulus:				
Pressure PSI:	0	20	0	19
Rate MCFD:	-	0	-	-

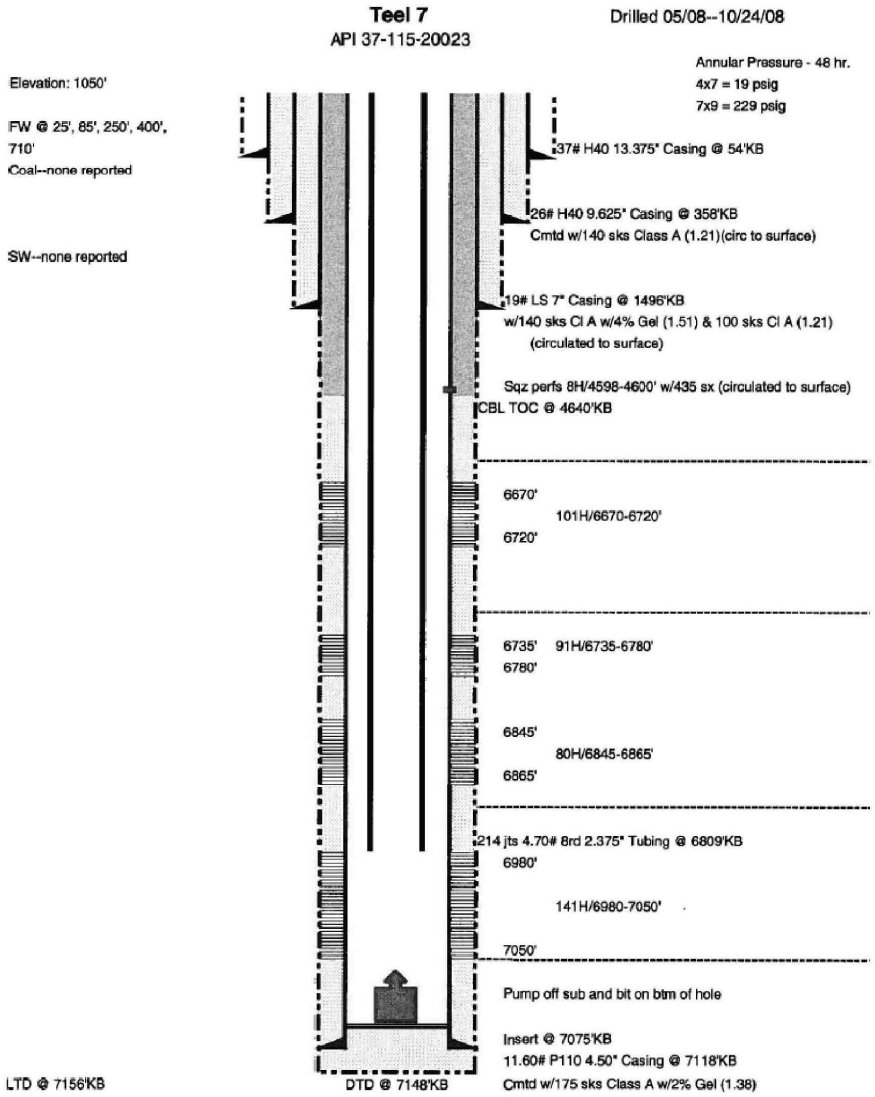
Water wells > 7 MG/L:

≤ 1000'	None
1000'-2500'	None

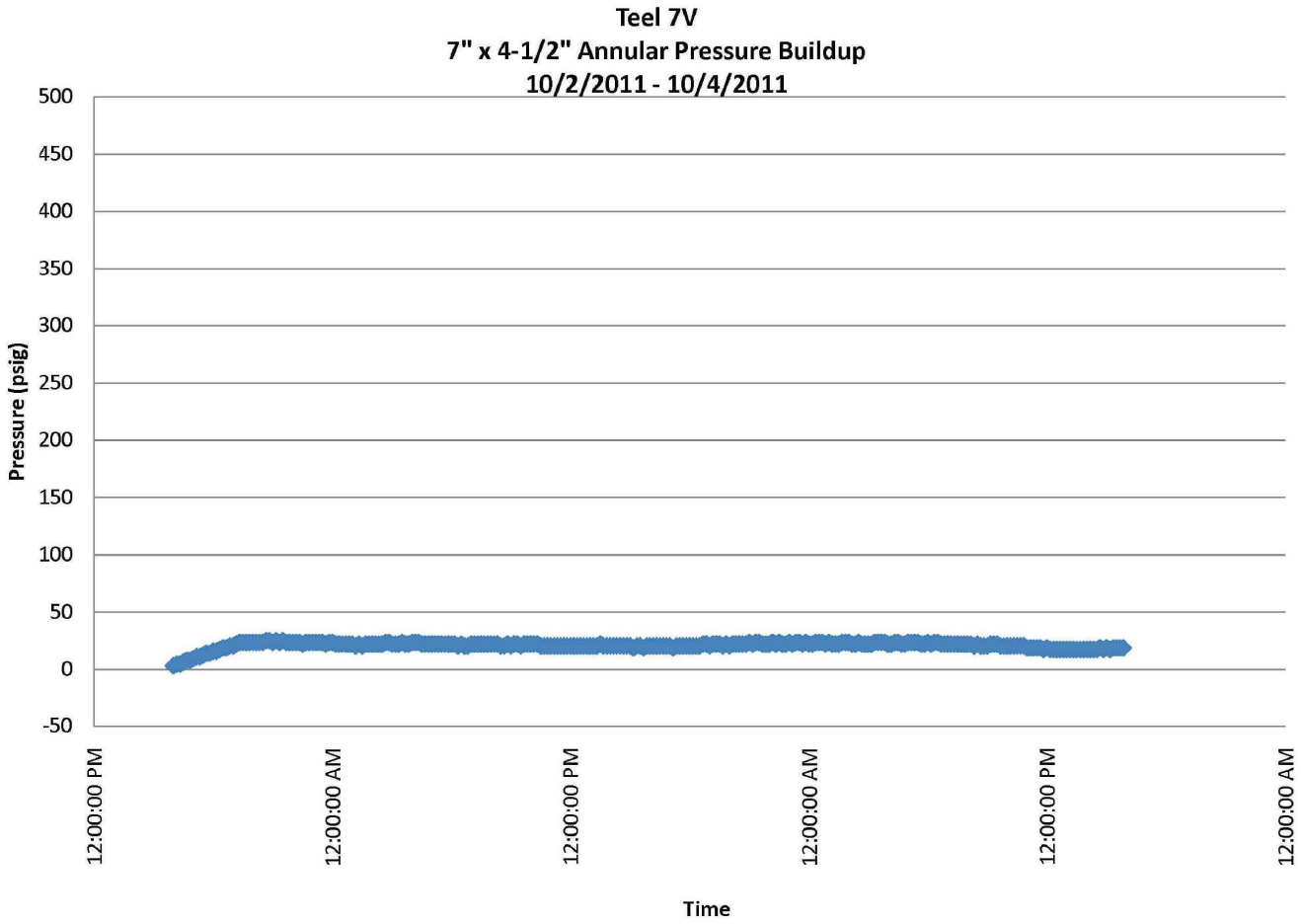
Plan Forward: Retest, vent annulus.

Comments: Squeezed cement in 4-1/2 annulus. 2/08/2011

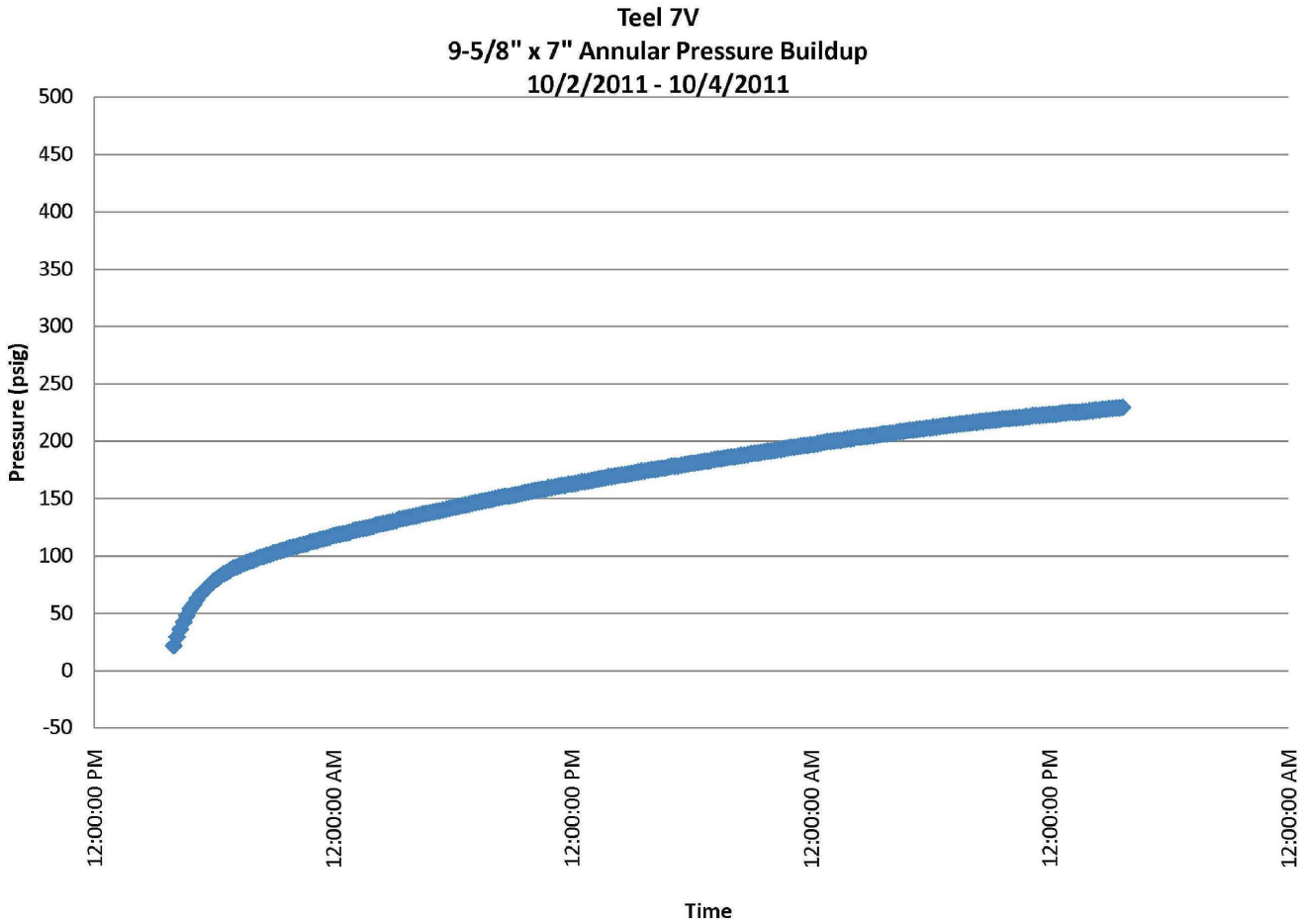
Teel 7V


Teel 7
API 37-115-20023
Drilled 05/08--10/24/08
Annular Pressure - 48 hr.
4x7 = 19 psig
7x9 = 229 psig
Elevation: 1050'
FW @ 25', 85', 250', 400', 710'
Coal--none reported
SW--none reported
37# H40 13.375" Casing @ 54'KB
26# H40 9.625" Casing @ 358'KB
Cmtd w/140 sks Class A (1.21)(circ to surface)
19# LS 7" Casing @ 1496'KB
w/140 sks Cl A w/4% Gel (1.51) & 100 sks Cl A (1.21)
(circulated to surface)
Sqz perfs 8H/4598-4600' w/435 sx (circulated to surface)
CBL TOC @ 4640'KB
6670'
101H/6670-6720'
6720'
6735'
91H/6735-6780'
6780'
6845'
80H/6845-6865'
6865'
214 jts 4.70# 8rd 2.375" Tubing @ 6809'KB
6980'
141H/6980-7050'
7050'
Pump off sub and bit on btm of hole
Insert @ 7075'KB
11.60# P110 4.50" Casing @ 7118'KB
Cmtd w/175 sks Class A w/2% Gel (1.38)
LTD @ 7156'KB
DTD @ 7148'KB

Teel 7V


Teel 7V
7" x 4-1/2" Annular Pressure Buildup
10/2/2011 - 10/4/2011
Pressure (psig)
500
450
400
350
300
250
200
150
100
50
0
-50
12:00:00 PM
12:00:00 AM
12:00:00 PM
12:00:00 AM
12:00:00 PM
12:00:00 AM
Time

Teel 7


Teel 7V
9-5/8" x 7" Annular Pressure Buildup
10/2/2011 - 10/4/2011
Pressure (psig)
500
450
400
350
300
250
200
150
100
50
0
-50
12:00:00 PM
12:00:00 AM
12:00:00 PM
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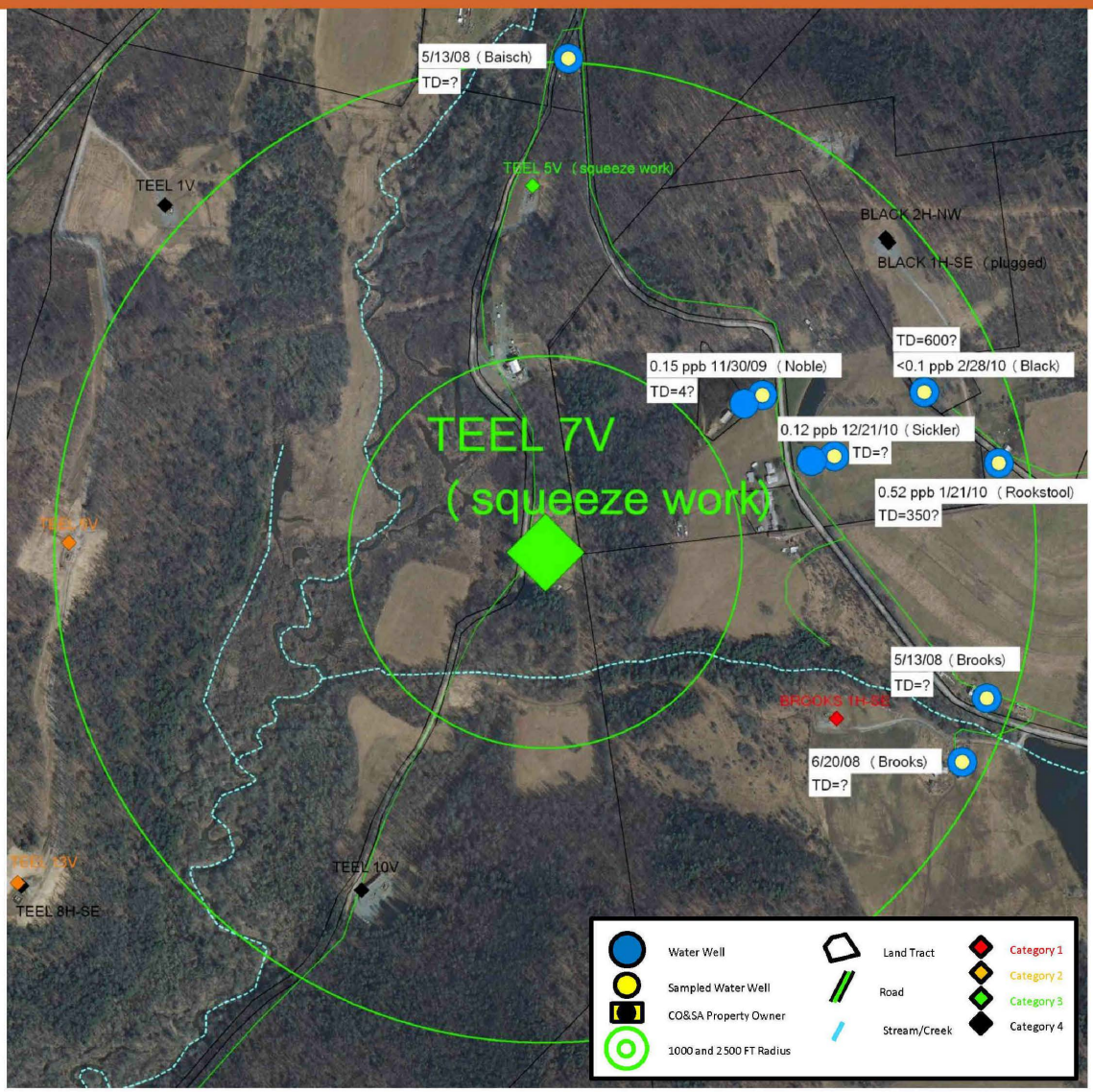
12:00:00 PM
12:00:00 AM
Time

Teel 7V


5/13/08 (Baisch)
TD=?
TEEL 5V (squeeze work)
TEEL 1V
BLACK 2H-NW
BLACK 1H-SE (plugged)
TD=600?
<0.1 ppb 2/28/10 (Black)
0.15 ppb 11/30/09 (Noble)
TD=4?
0.12 ppb 12/21/10 (Sickler)
TD=?
TEEL 7V
(squeeze work)
0.52 ppb 1/21/10 (Rookstool)
TD=350?
TEEL 9V
5/13/08 (Brooks)
TD=?
BROOKS 1H-SE
6/20/08 (Brooks)
TD=?
TEEL 13V
TEEL 10V
TEEL 8H-SE
Water Well
Sampled Water Well
CO&SA Property Owner
1000 and 2500 FT Radius
Land Tract
Road
Stream/Creek
Category 1
Category 2
Category 3
Category 4

Remediation History – Category III

Well Name	Remediation History
Ely 7H	Well is not completed.
Gesford 1V	None.
Hubbard 1V	None.
Kelley, P. 1H	Well is not completed.
Ratzel 1H	None.
Teel 2V	None.
Teel 5V	Squeezed cement in 4-1/2 annulus. (4,602' -0') w/ 435 Sx – 2/14/2011.
Teel 7V	Squeezed cement in 4-1/2 annulus. (4,600'-850') w/ 435 Sx – 2/7/2011.

Summary – Category III

Well Name	Comments	Action Taken	Action Plan
Ely 7H	Zero annular pressure	Vent Annulus	None
Gesford 1V	Annular pressure decreased, 5x8 – 1 psi	Vent Annulus	None
Hubbard 1V	Zero annular pressure	Vent Annulus	None
Kelley, P. 1H	Annular pressure decreased	Vent Annulus	None
Ratzel 1H	Annular pressure decreased	Vent Annulus	None
Teel 2V	Annular pressure increased on 4x7, TOC below shoe	Vent Annulus	Monitor flow
Teel 5V	7x9 – 0 psi, 4x7 – 3 psi	Vent Annulus	None
Teel 7V	Annular pressure increased	Vent Annulus	Check for wellhead leak

Category: IV

No gas present in any annular space.

Remediation History – Category IV

Well Name	Remediation History
Baker 3H	None – Well not completed.
Black 1H	None.
Black 2H	None.
Costello 2V	Squeeze 4-1/2 casing (5,502'-3,400') – 4/9/2009. Squeeze 4-1/2 casing (3,352'-1,270') – 4/12/2009.
Ely 2V	Squeeze 4-1/2 casing (5,440'-1,585') – 1/10/2011. Squeeze 4-1/2 casing (1,587'-1,585') – 1/18/2011. Casing patch casing (1,570'-1,600') – 1/24/2011.
Ely 6H	Squeeze 7x9 (0'-559') – 9/27/2008. Attempt squeeze (1,468'-1,470'), (1,344-1,346'), (620'-622') – 3/6-9/2011.
Gesford 4R	None – Well not completed.

Remediation History – Category IV

Well Name	Remediation History
Gesford 5H	Squeeze 4-1/2 casing (5,766'-4,730') – 3/4/2010. Casing patch 4-1/2 casing (5,751'-5,781') – 3/11/2010.
Gesford 7H	Squeeze 4-1/2 casing (5,783'-1,550') – 10/13/2009.
Gesford 8H	None – Well not completed.
Grimsley 2H	Squeeze cement (6,336'-0') – 10/23/2009. Casing patch (6,315'-6,345') – 10/28/2009.
Heitsman 1H	None.
Heitsman 2V	None.
A&M Hibbard 2H	Squeeze (5,945'-1,800') – 3/16/2010. Well not completed.
A&M Hibbard 4H	None – Well not completed.

Remediation History – Category IV

Well Name	Remediation History
Hubbard 6H	Squeeze cement (6,011'-1,600') – 8/18/2009.
Hull 2H	Squeeze cement (6,126'-3,296') – 9/21/2009. Casing patch (6,123'-6,153') – 12/2/2009.
Lewis 1V	None.
Lewis 2V	None.
Rozanski 1V	None.
Teel 1V	None.

Summary – Category IV

Well Name	Comments	Action Item
Baker 3H	Well is not completed.	Vent Annulus
Black 1H	4x7 pressure is 0.	Vent Annulus
Black 2H	4x7 pressure is 0.	Vent Annulus
Costello 2V	5x8 pressure is 0.	Vent Annulus
Ely 2V	4x7 pressure is 0.	Vent Annulus
Ely 6H	4x7 pressure is 0.	Vent Annulus
Gesford 4R	Well is not completed	Vent Annulus
Gesford 5H	4x9 pressure is 4#.	Vent Annulus

Summary – Category IV

Well Name	Comments	Action Item
Gesford 7H	4x9 pressure is 0.	Vent Annulus
Gesford 8H	Well is not completed.	Vent Annulus
Grimsley 2H	5x9 pressure is 0.	Vent Annulus
Heitsman 1H	4x7 pressure is 0.	Vent Annulus
Heitsman 2V	4x9 pressure is 0.	Vent Annulus
A&M Hibbard 2H	Well is not completed.	Vent Annulus
A&M Hibbard 4H	Well is not completed.	Vent Annulus
Hubbard 6H	4x7 pressure is 0.	Vent Annulus

Summary – Category IV

Well Name	Comments	Action Item
Hull 2H	5x9 pressure is 0.	Vent Annulus
Lewis 1V	4x7 pressure is 0.	Vent Annulus
Lewis 2V	4x7 pressure is 0.	Vent Annulus
Rozanski 1V	4x7 pressure is 0.	Vent Annulus
Teel 1V	4x7 pressure is 0.	Vent Annulus

Remediation History – Category-Other

Well Name	Remediation History
Baker 1V	Well PA 6/21/2010.
Gesford 3V	Well PA 5/24/2010.
Gesford 9V	Well PA 5/23/2010.

Summary

Summary

- Methane in the water in northeast Pennsylvania is naturally occurring and its presence confirmed through geologic investigation.
- Pre-drill water sample map clearly demonstrates elevated methane readings especially in valleys (geologic setting similar to Carter Road area).
- Study proves that elevated methane levels in Susquehanna County are part of background and will be confirmed through additional water well sampling.
- Cabot has completed all required items under the CO&SA.
- Cabot's operations in northeast Pennsylvania meet or exceed regulatory requirements under Chapter 78 and are similar to or better than other operators in the Area.
- Methane treatment systems WORK and satisfy concerns for water quality and safety, including removing secondary constituents.

Recommendations

- Stop delivering water with the support of the DEP and continue to monitor and offer treatment systems
- Begin fracing the uncompleted wells in the CO&SA area
- Resume drilling in CO&SA area
  - Gather 8 quarters of water data per CO&SA