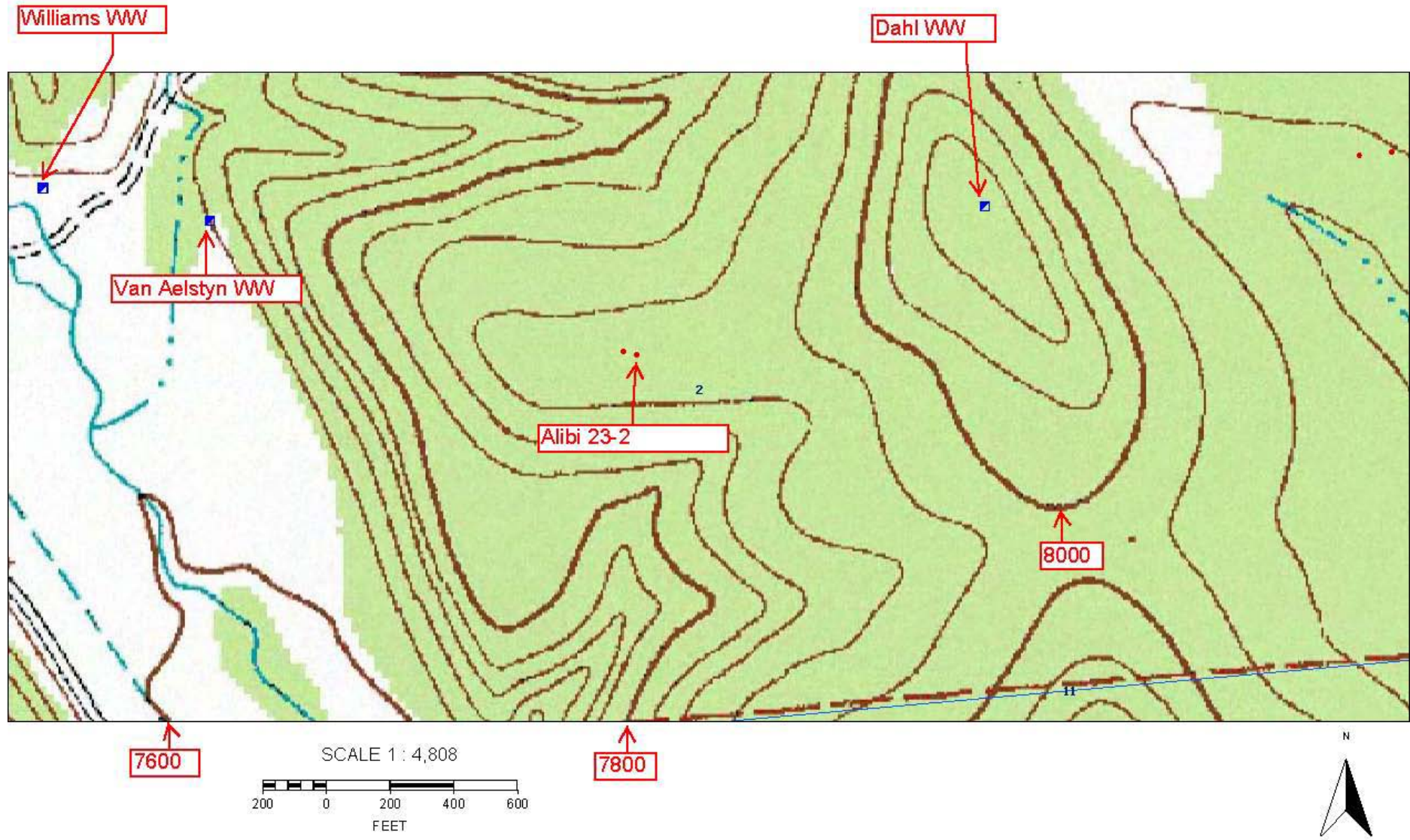
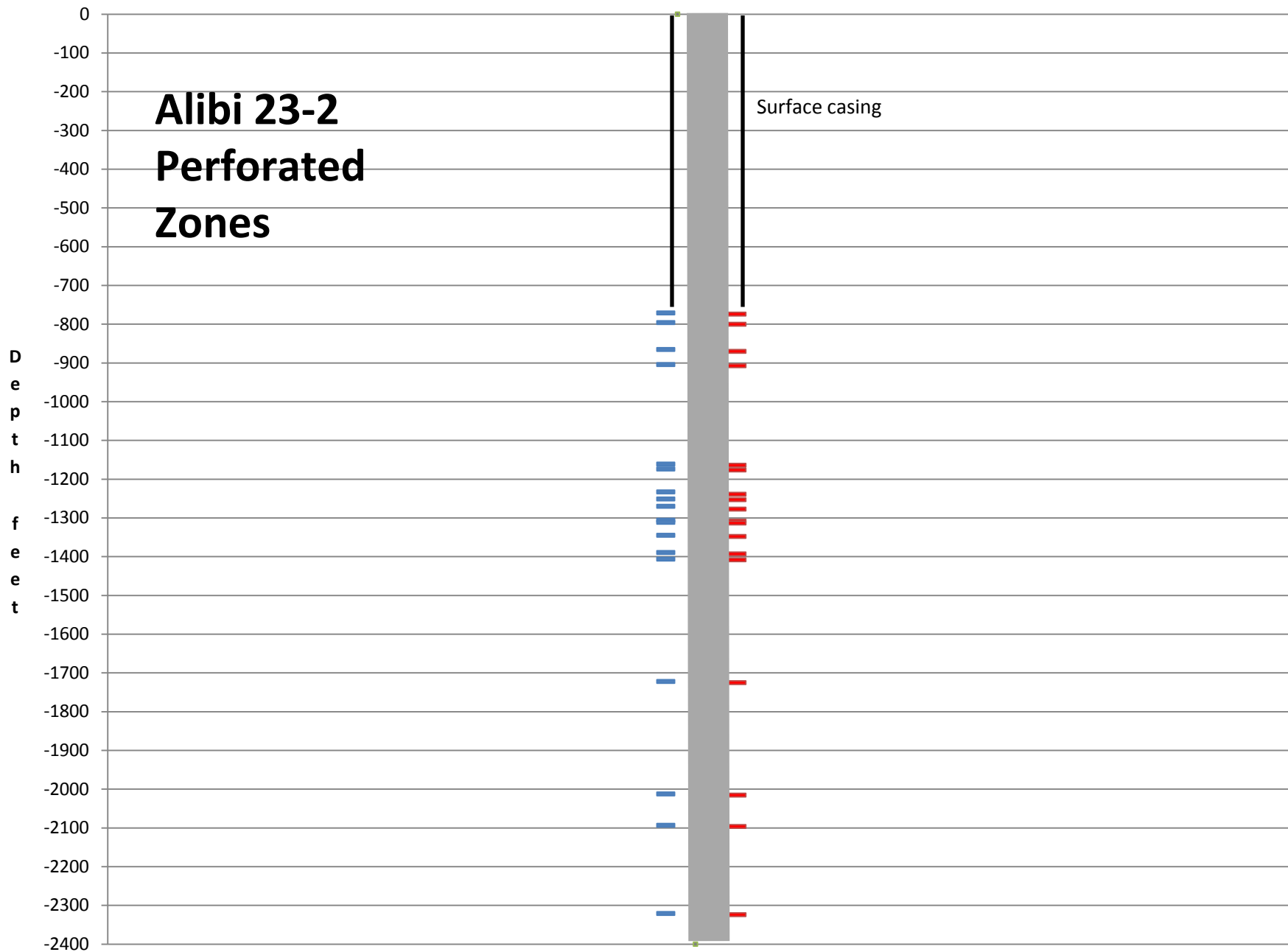


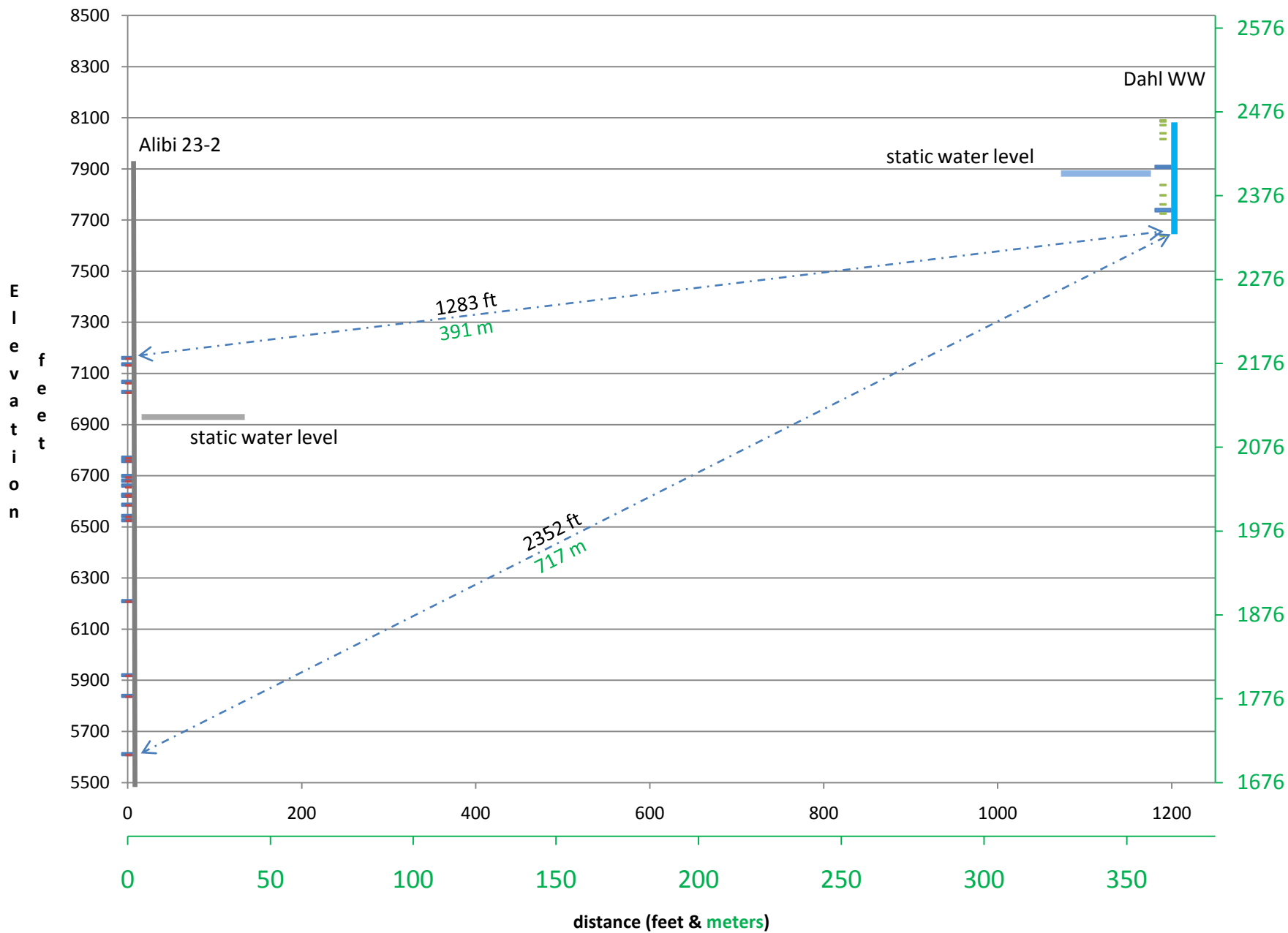
# Cause 1V Docket 1102-OV-04

## Staff Presentation

- 1. No frac liquid chemicals found in the Dahl well
- 2. No gas from the frac was found in the Dahl well
- 3. Sediment from the well water from the geologic formation the well is drilled and unrelated to the frac solids
- 4. The water quality of the Dahl well is good, and chemical constituents have not changed from samples before the frac job and after the frac job
- 5. Engineering evaluation of the cement job at the Pioneer well indicates it meets Commission requirements

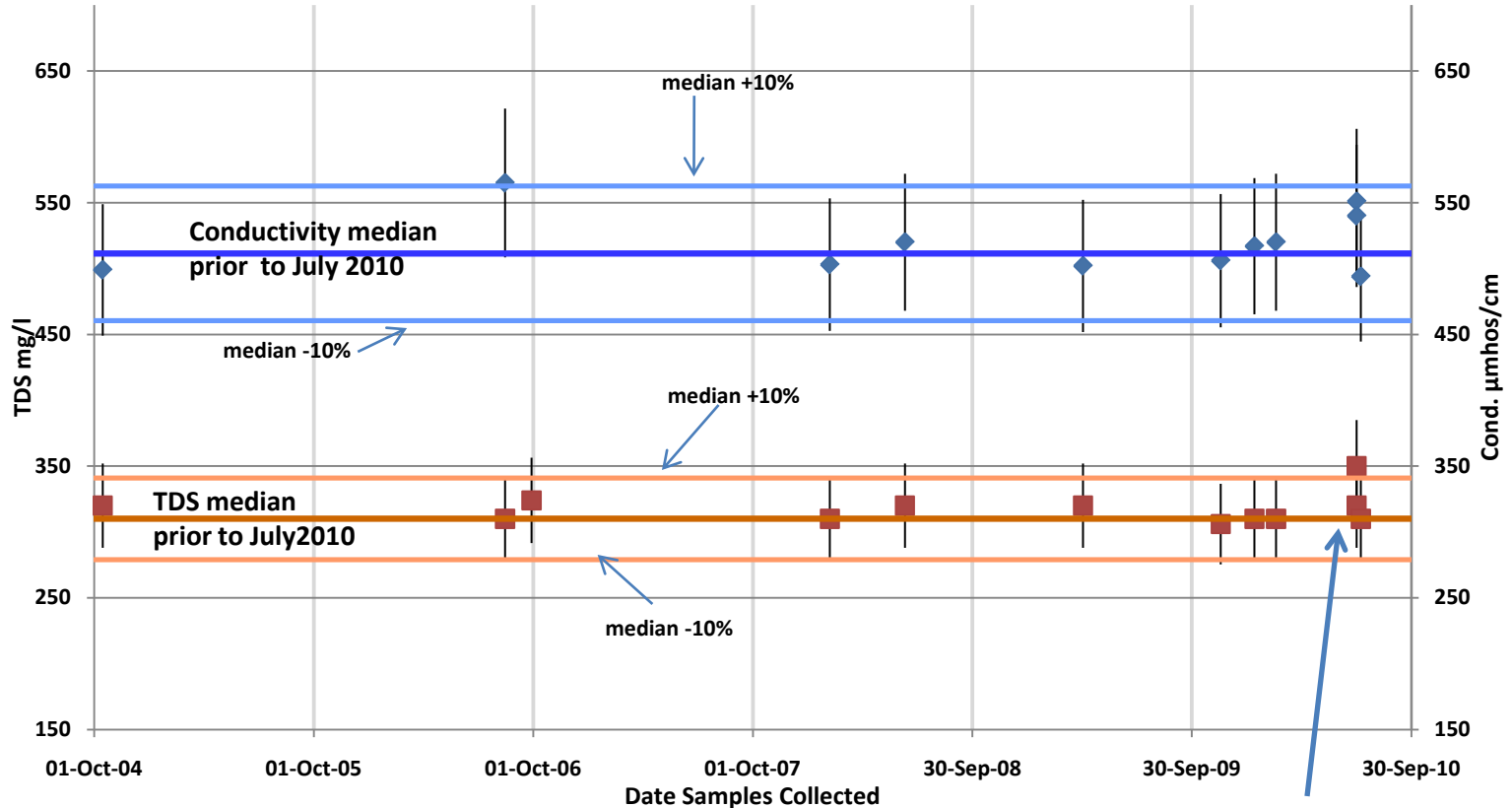






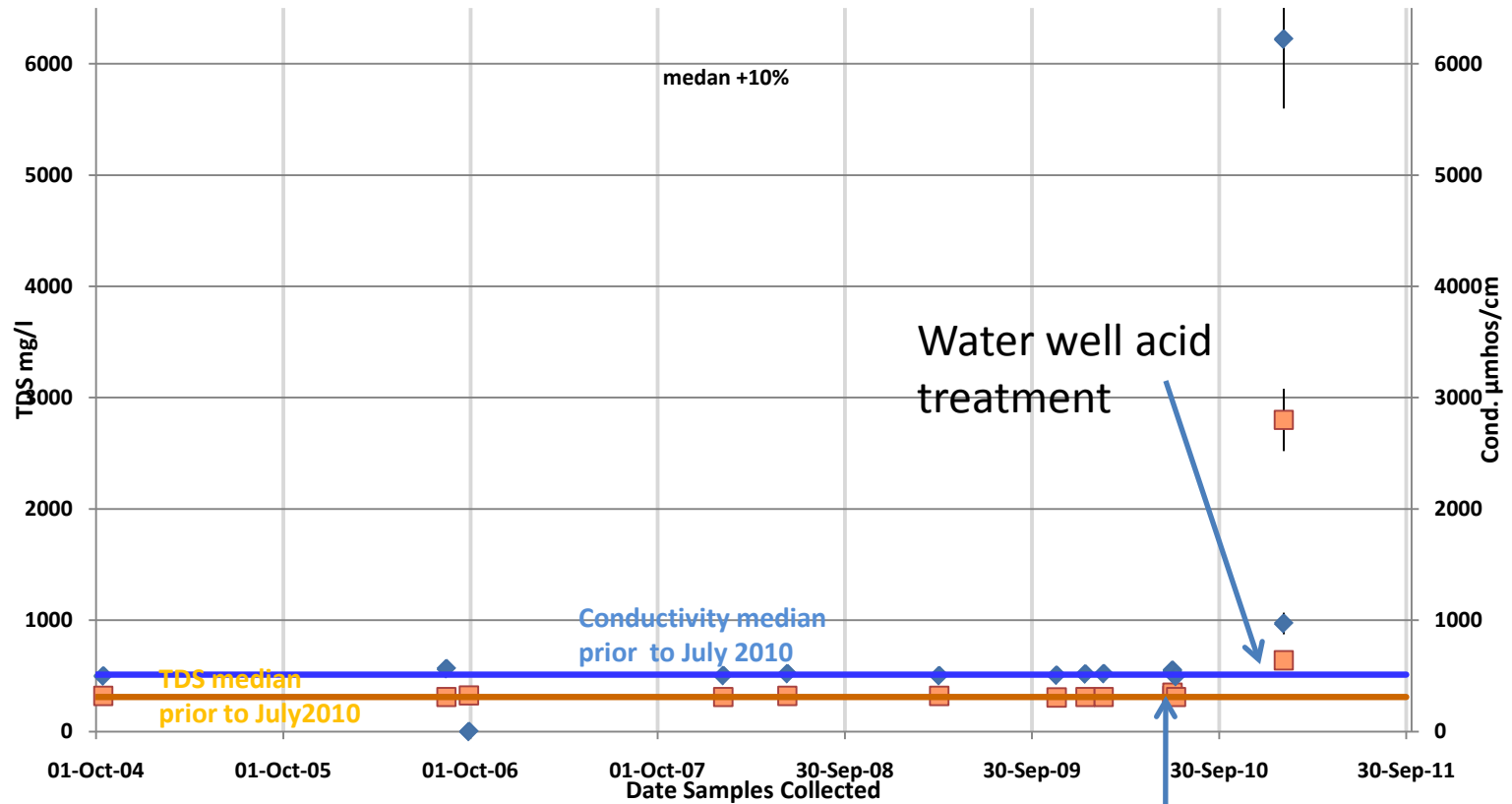
# Dahl Water Well

## Total Dissolved Solids and Conductivity



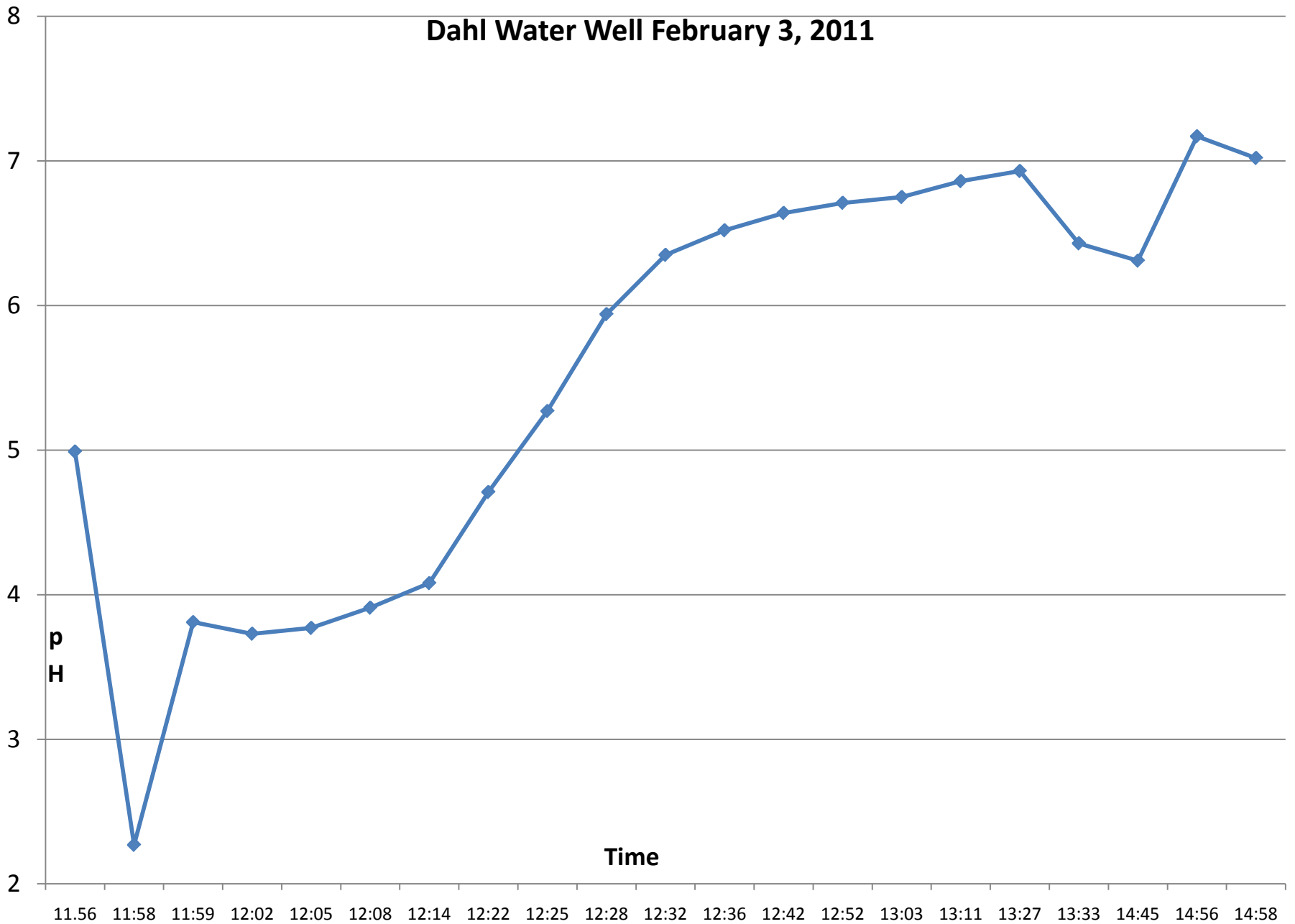
Alibi 23-2 frac

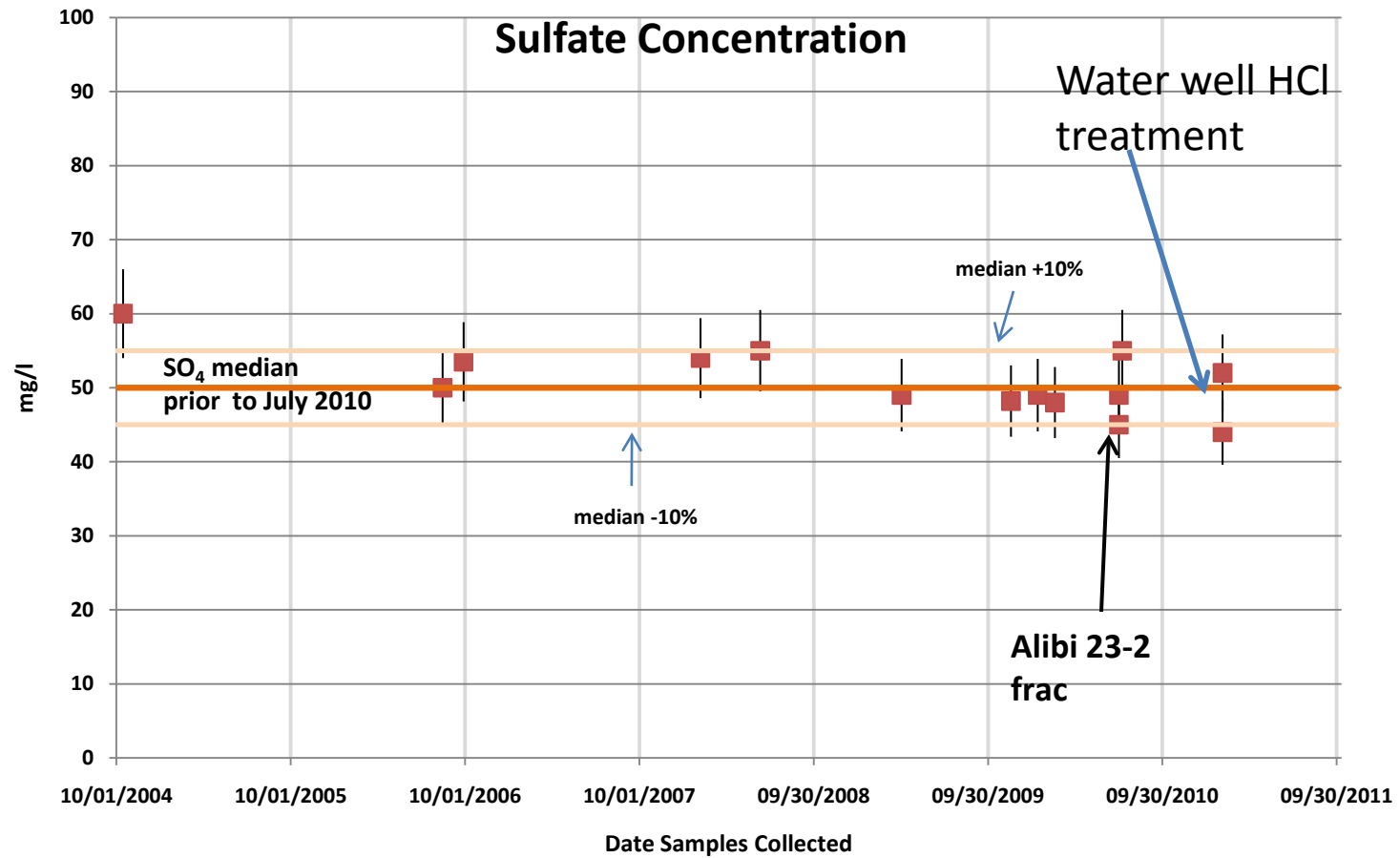
## Total Dissolved Solids and Conductivity



Alibi 23-2 frac

# Dahl Water Well February 3, 2011

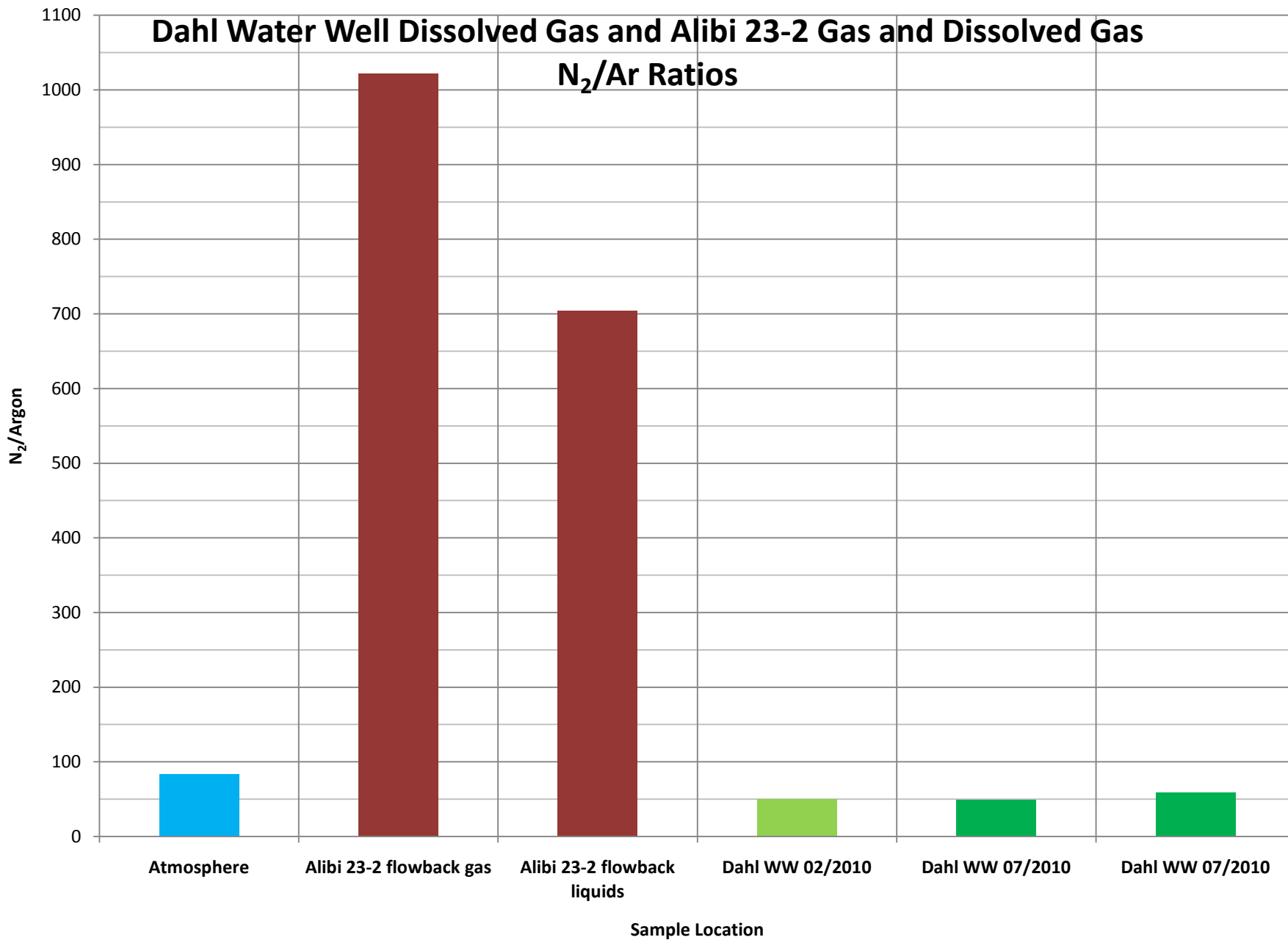


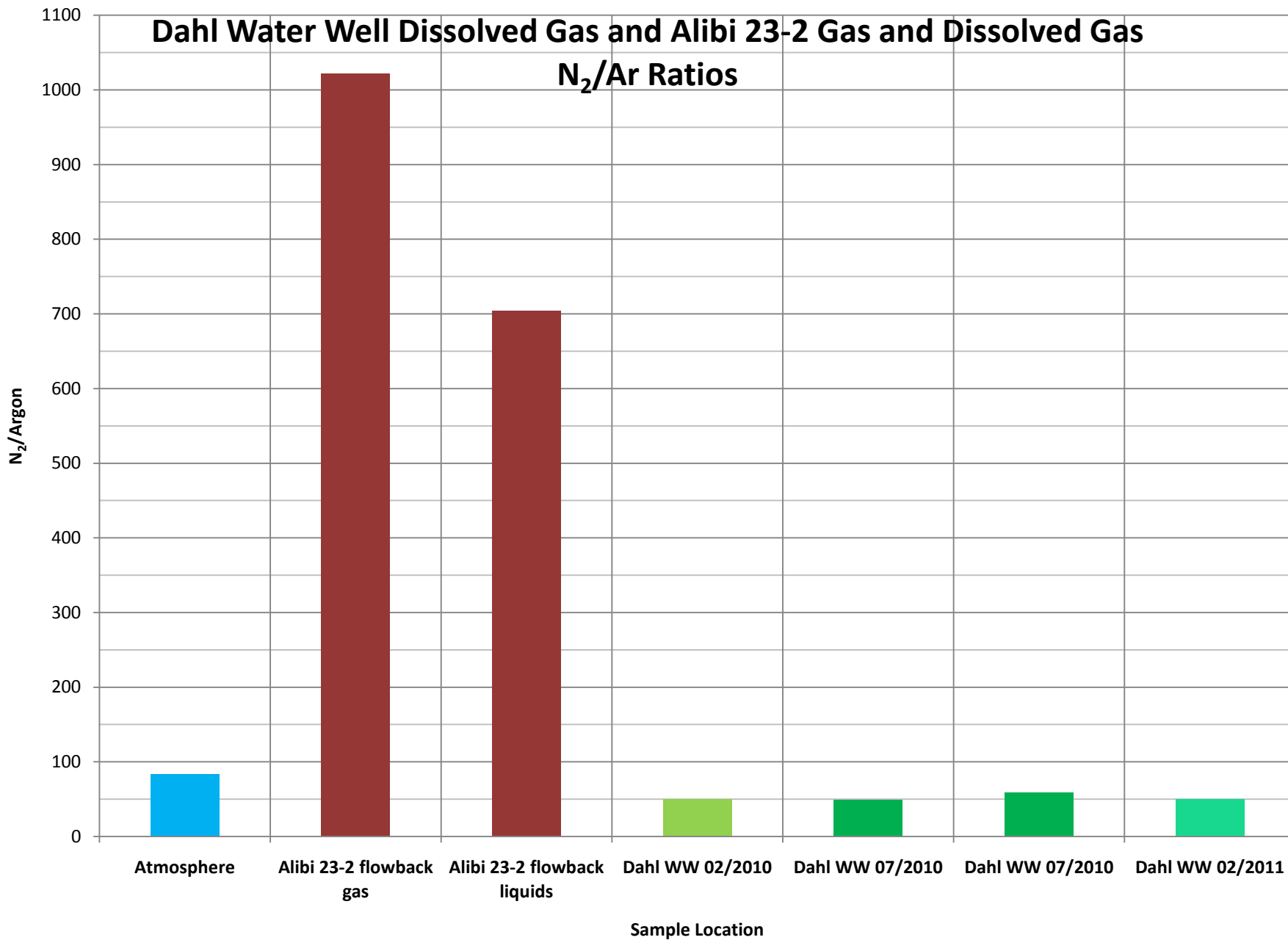




# Frac Chemicals

- Foamer was approximately 0.1% (by weight) of the injected frac fluid/gas/solid mixture
  - Foamer contains 1-10% each of
    - ethylene glycol, methanol and 2-butoxyethanol
- Analysis of Dahl water well samples
- None of the chemicals from the foamer product were detected in Dahl WW samples





# Mineral Analysis Summary

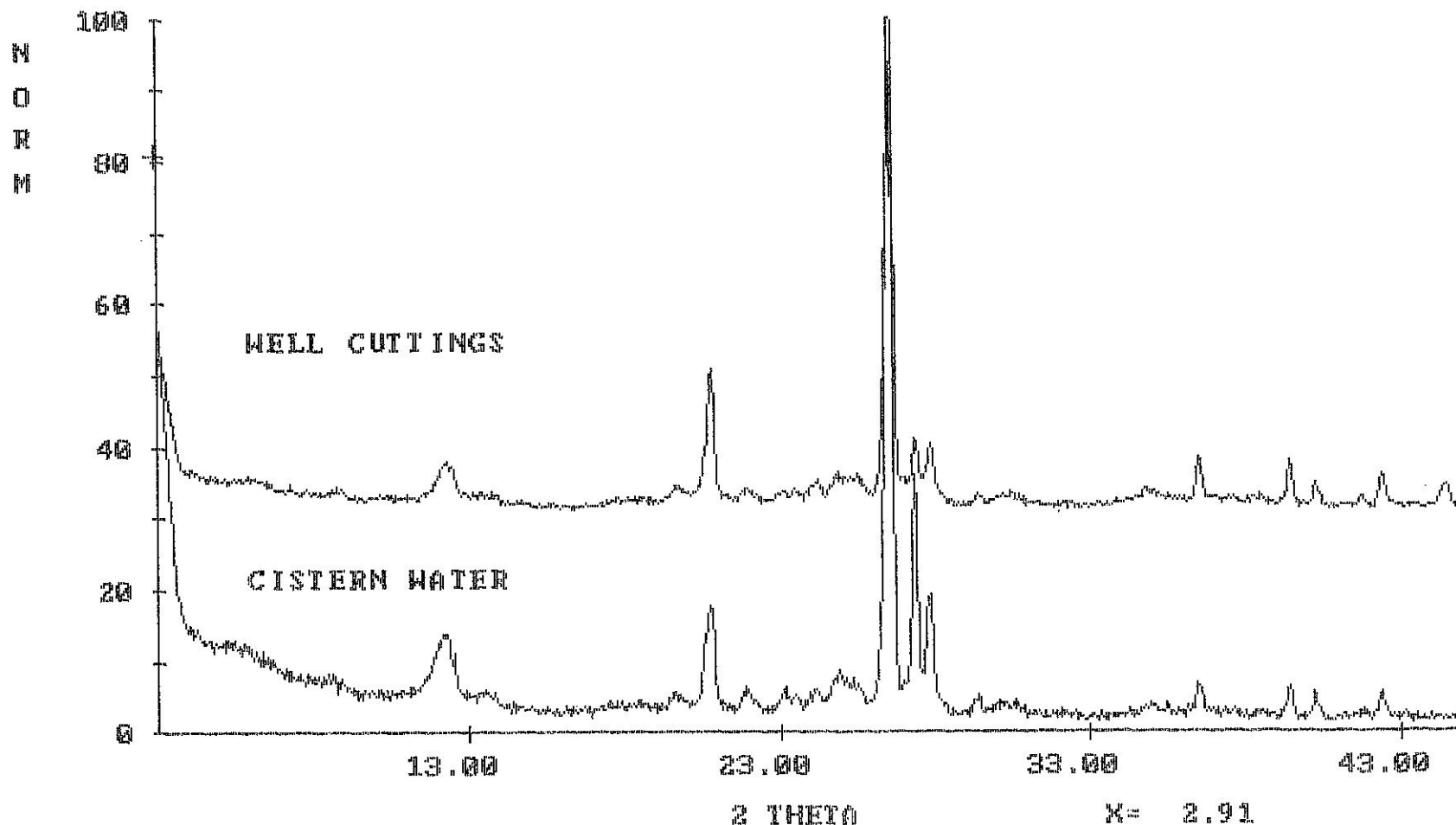
	Cuttings	Cistern	Frac Sand
Quartz	50%	33%	>98%
Plagioclase	12%	11%	
K Feldspar	8%	14%	
Chlorite	3%	5%	
Mica/Illite	6%	8%	
Amphibole	2%	<2%	
Calcite	<2%	3%	
Smectite	6%	13%	
Kaolin	10%	11%	

# Mineral Analysis Summary

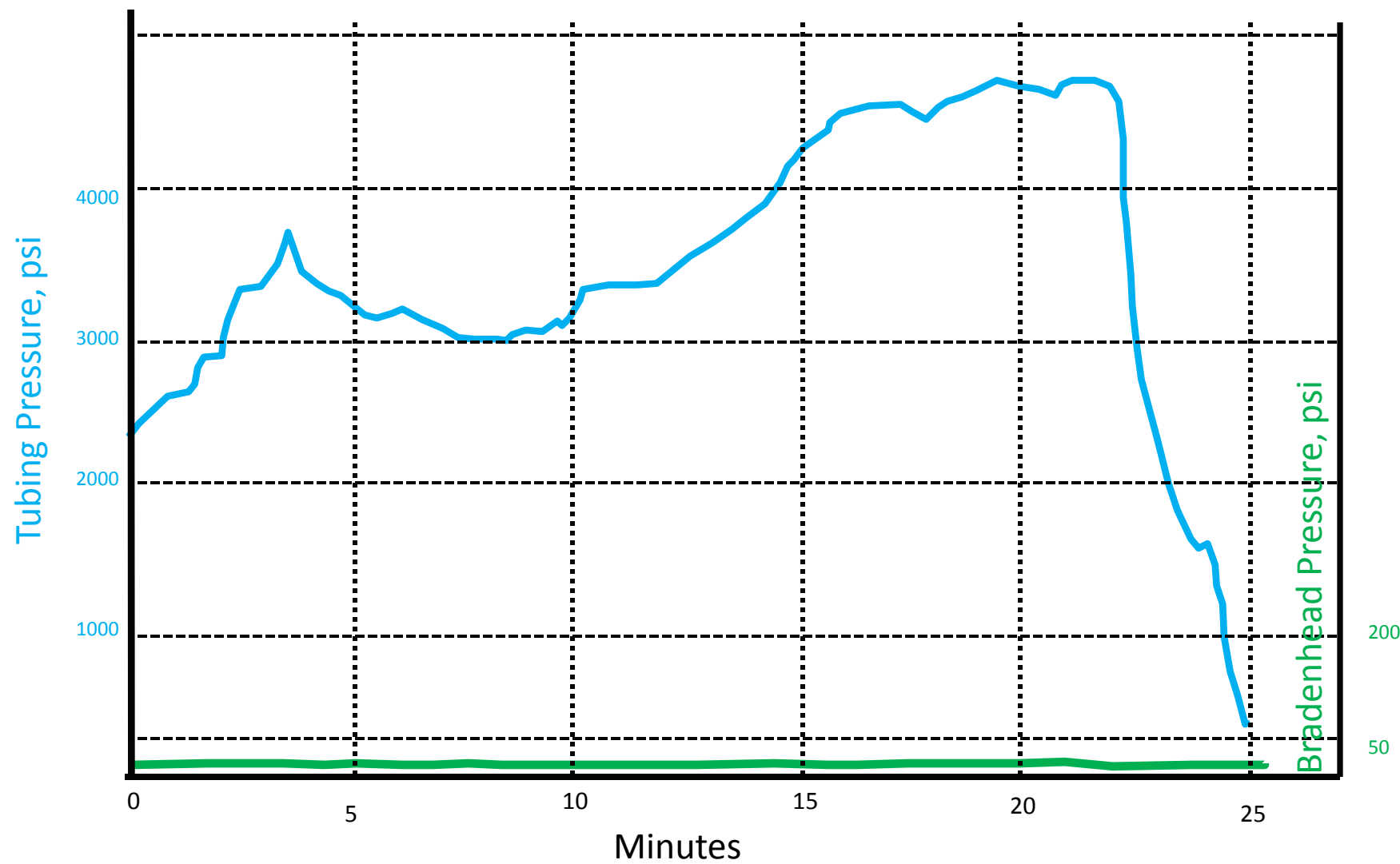
	Cuttings	Cistern	February 2011 Sediment
Quartz	50%	33%	19%
Plagioclase	12%	11%	<5%
K Feldspar	8%	14%	14%
Chlorite	3%	5%	<5%
Mica/Illite	6%	8%	5%
Amphibole	2%	<2%	
Calcite	<2%	3%	
Smectite	6%	13%	29%
Kaolin	10%	11%	25%

# X-ray Diffraction Pattern of Sediment Filtered from Dahl Cistern Water and XRD Pattern of Cuttings from Dahl Water Well

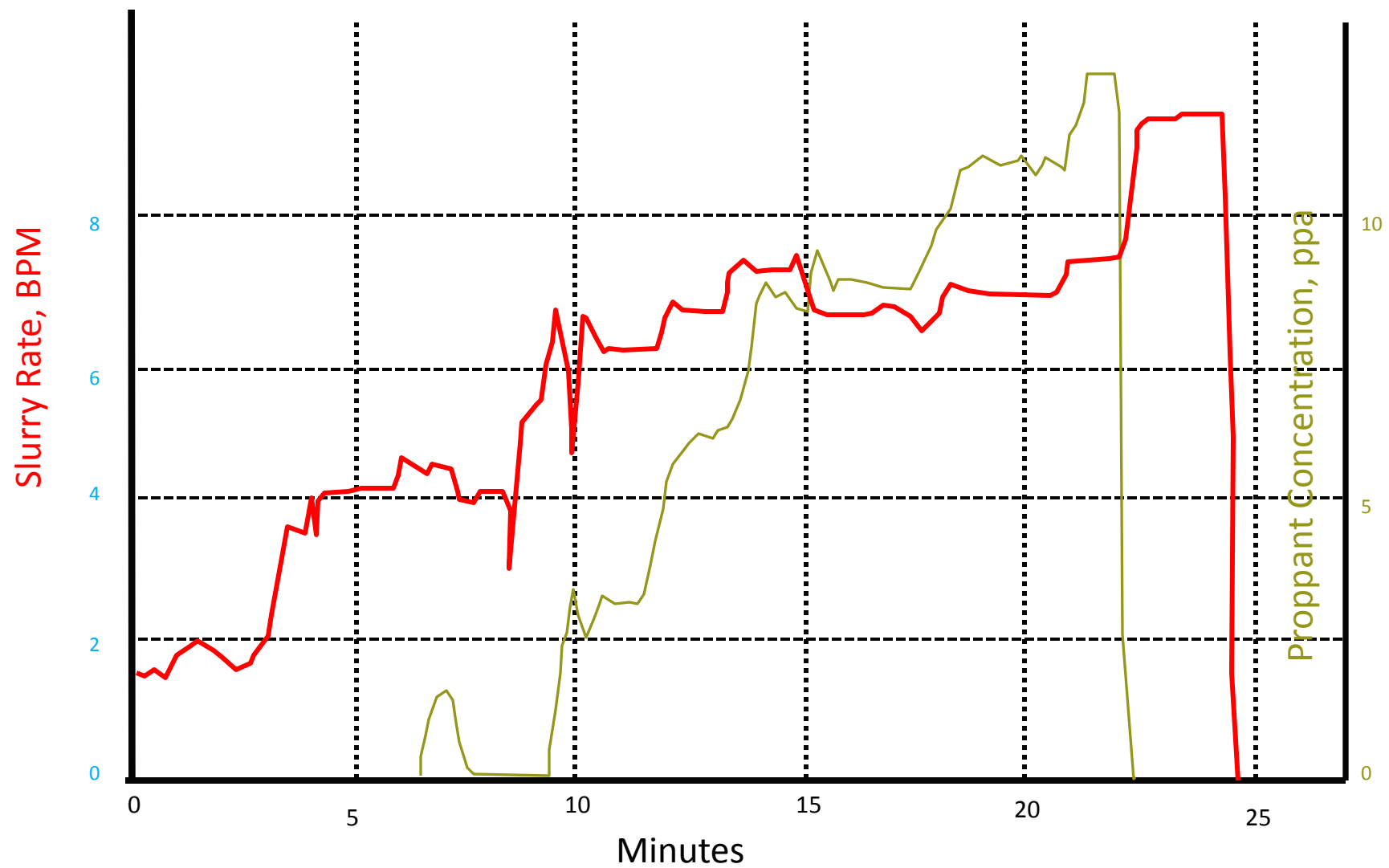
COGC19 7/17/10 S= .04 T= 1.0 COGCC19-2  
COGCC19-3 WELL CUTTINGS



# Frac Pressure Monitoring Example Stage 10 Alibi 23-2 1161'-1176'



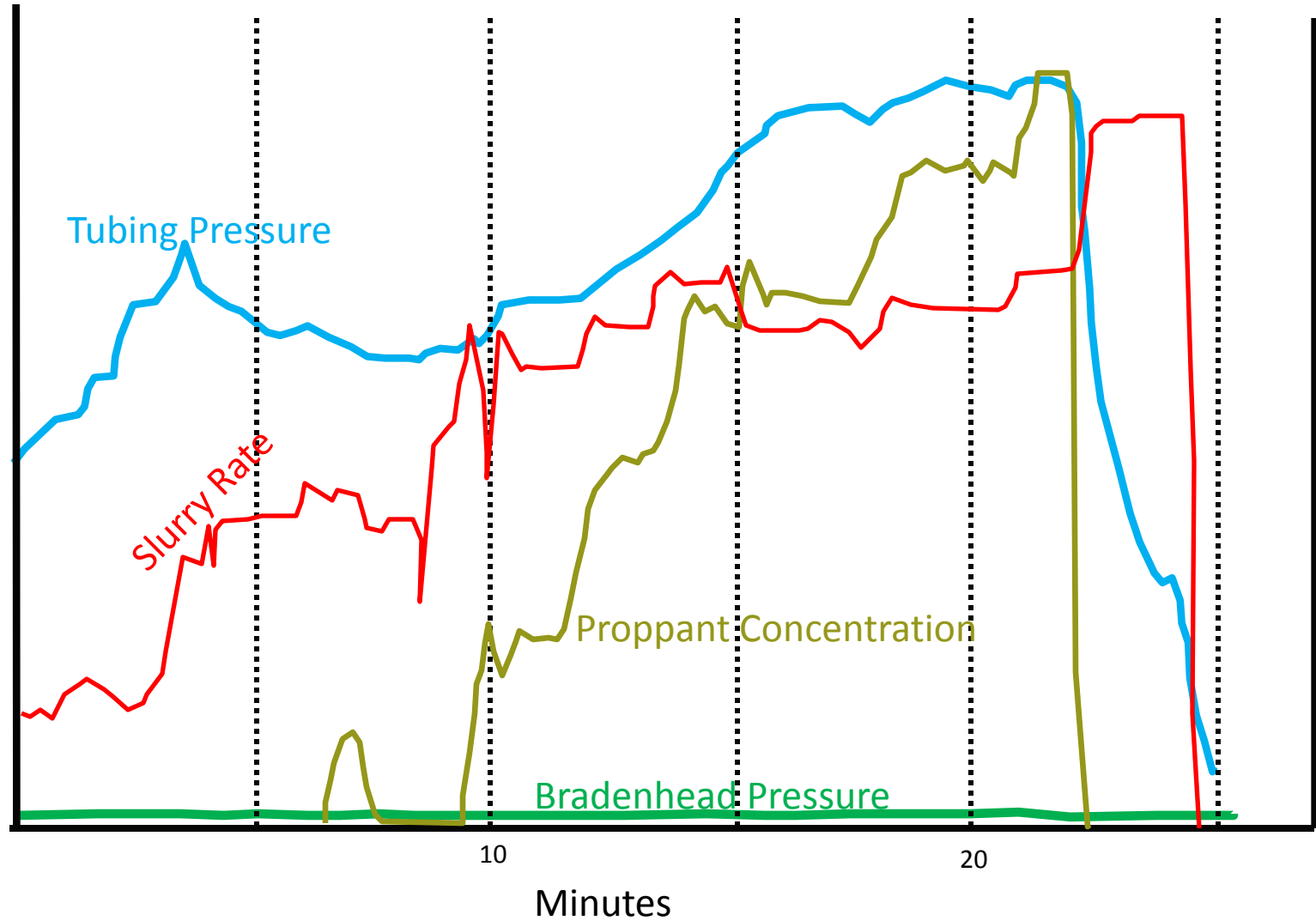
# Pump Rates Example Stage 10 Alibi 23-2 1161'-1176'





# Pressure Monitoring and Pump Rates Example

## Stage 10 Alibi 23-2 1161'-1176'



# Conclusions

- No changes in water quality attributable to frac process
  - No frac gas phase, liquid phase or solid phase impacts
    - Rules 209 and 324A.a
- Changes in water quality caused by well maintenance activities
  - THMs, increased chloride, iron oxides, sediment

# Conclusions

- Engineering staff review of application to drill and subsequent submitted records and logs of drilling and completion submitted to COGCC for Alibi 23-2 indicate surface and production casing design and installation were with done in accordance with applicable COGCC rules

- No analytical data supports violation of rules 209 or 324
- No records or logs of the Alibi 23-2 drilling and completion support violations of various sections of rule 317
- **No basis for Commission to approve Order Finding Violation**