

# Draft Proposal to Assess Fracture Flow Conditions in 6 Wells in Town of Sherman, CT

Presented by  
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# Background of UCONN Involvement

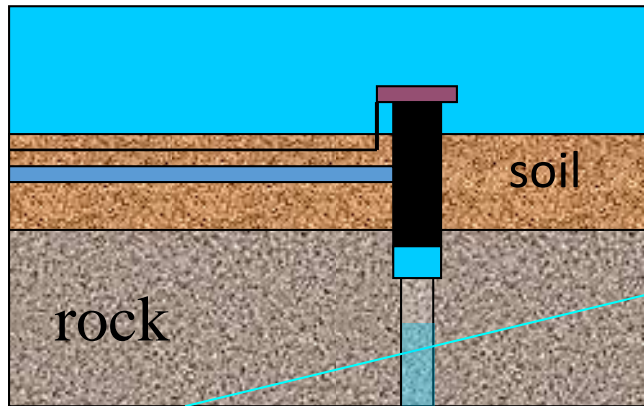
- Since 2016
- Helping to analyze salt and nitrate contamination as to the source of the well problems
- Provided analysis of major ion data collected by the town
- Collected water samples for novel assessments field parameters, recaltrant constituents and bacteria as source tracers)
- General notes
  - Salt contamination is become a more common contaminant in wells
  - The nature of fracture rock and bedrock wells makes it difficult to determine sources of problems from well water samples

# Fractured Bedrock Aquifer





# Bedrock Well



# Proposal Objectives

- Determine which fractures are contaminated with Salt and or Nitrate
  - Shallow fractures—problem local
  - Deep fractures—problem from distance
- Determine surface source areas based on fracture properties and chemistry of fracture water
- Assess means to curtail problem
  - Shallow fractures—E.g. extend casing, drill deeper, cement contaminated zones,  
new wells make deeper with deeper casing
  - Deep fractures—cement borehole

# Team

- Driller ( pull pumps and reinsert)
- Dr. Edwin A. Romanowicz, State University of New York, Plattsburg (downhole fracture identification and characterization)
- Dr. Gary Robbins (Manage project, analyze data)
- Two graduate students from UCONN (perform field work for water quality characterization)
- Dr. Meredith Metcalf, Eastern Connecticut State University (supervise downhole water quality collection and analysis)
- Undergraduates from ECSU to assist with field work.

# Wells

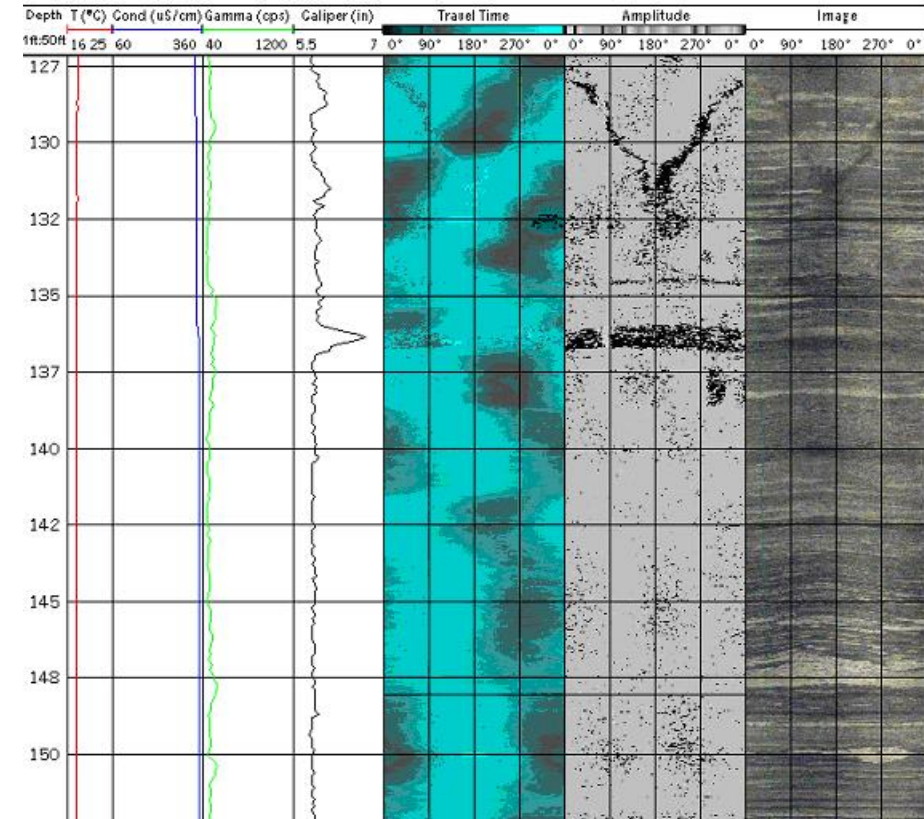
Address	Locations	Well Depth (ft.)	Depth to Bedrock (ft.)	Depth to Water (ft.)	Yield (gpm)
15 rt 39 N	Day Care				
2 rt 37 E2	School - New Well	405	10	27	10
2 Rt 37 E1	School - Older Well				
2 rt 39 n	Fire Department	380	13	16	40
9 rt 39 n	Mallory Town Hall	300	2	25	15
8 rt 37 c	Senior Center				

# Pull Pump and Tubing



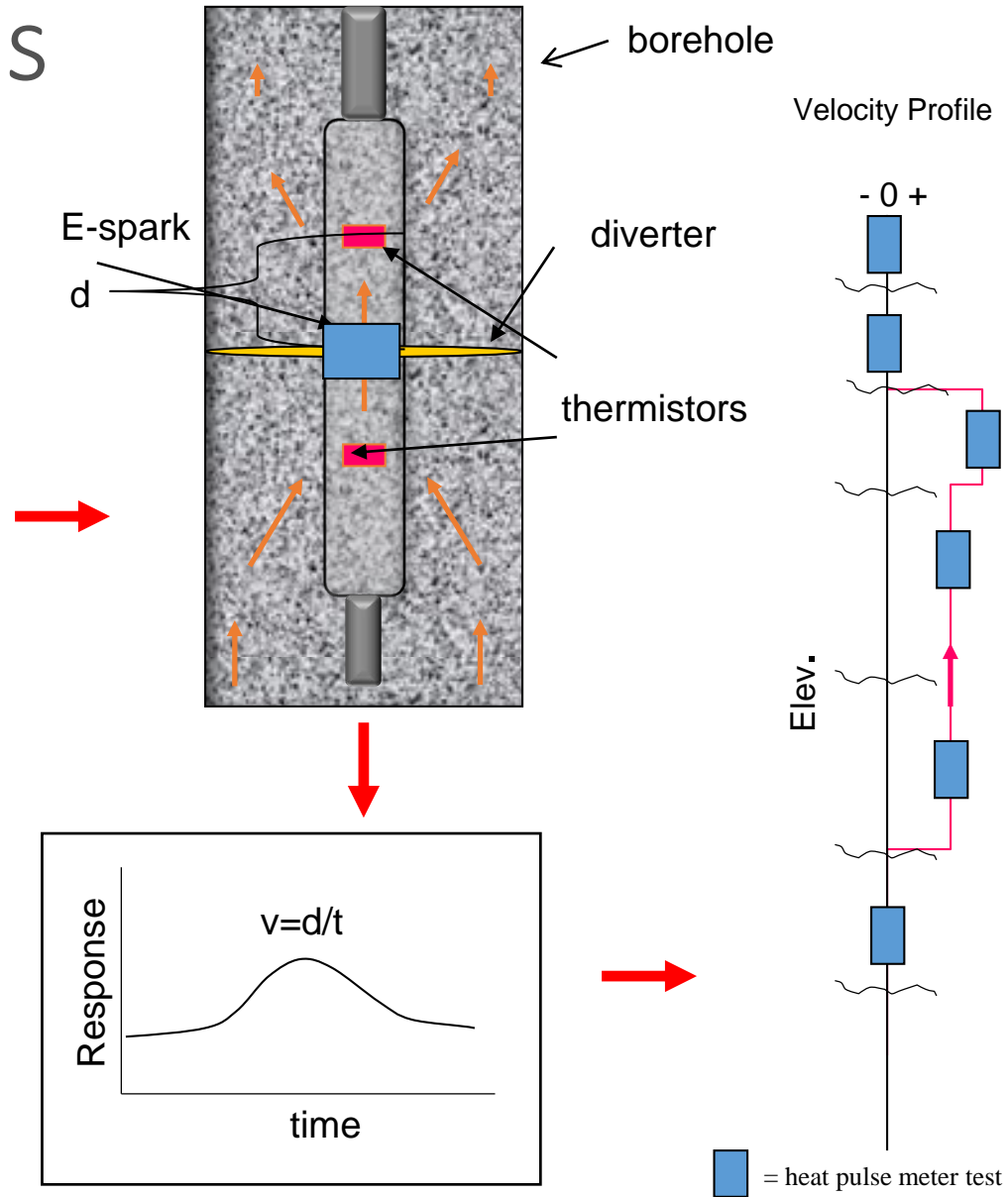


# Lower tools in well to locate fractures and determine properties



Depth  
Angles of tilt

# Downhole flow meter to determine water contributing fractures

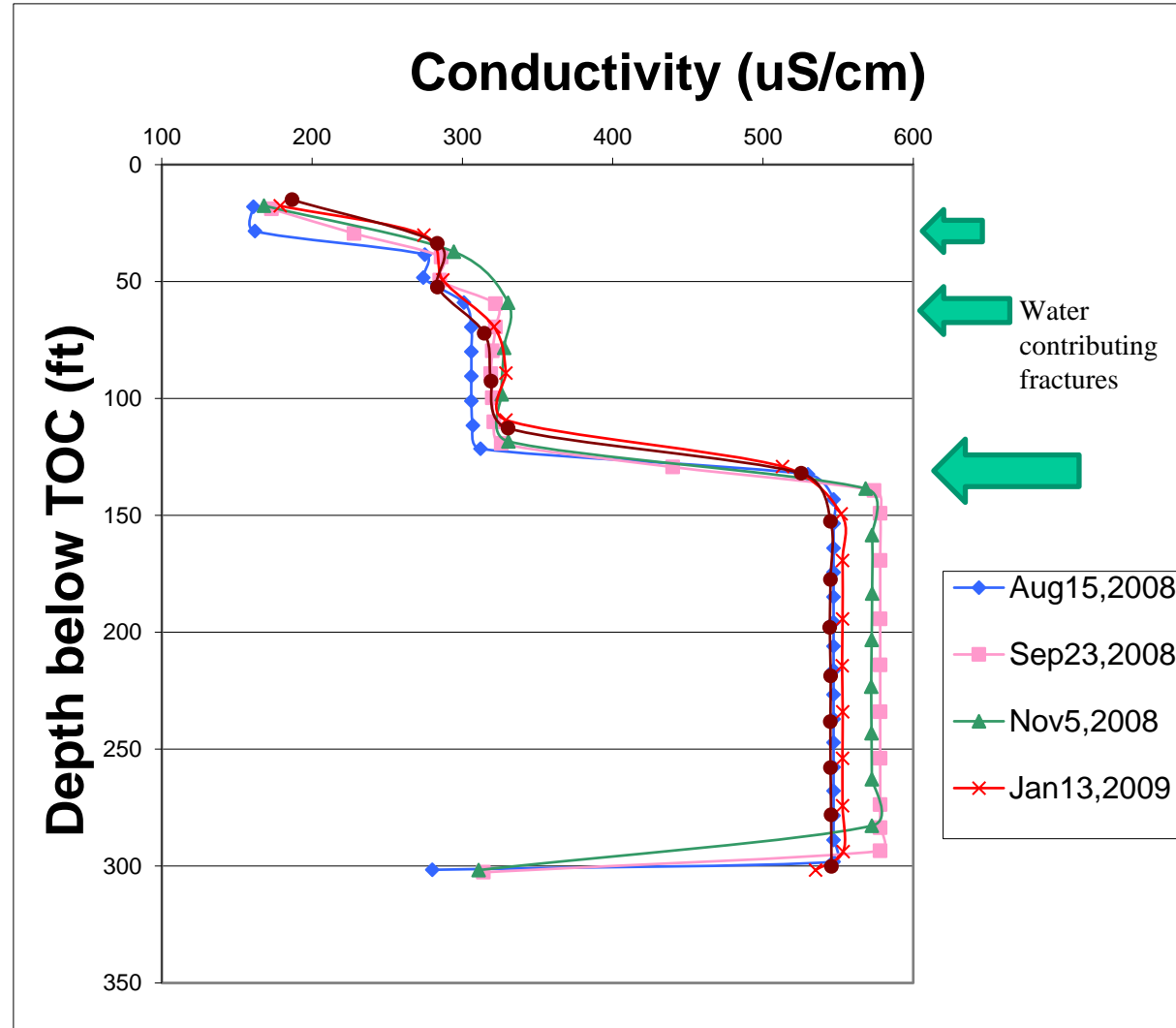




# Downhole Water Quality Profiling



# Salinity vs. Depth





# Hydrasleeve Water Quality Sampling



Characterize fracture water quality to determine nitrate and salt content

# Pump Back in and Disinfect



# Budget and Schedule

- Total estimated cost: **\$55,770**
- Driller—\$12,000-\$15,000 depending on the depth of the wells and how the pumps are set with pipe.
- SUNY Plattsburg for downhole geophysics and flow meter work --\$6784
- UCONN-\$31,620 and includes: support for Dr. Robbins and 2 graduate assistants, UCONN fringe benefits, travel, supplies and indirect costs (20%).
- ECSU: \$2,366 (hourly wages for undergrads and indirects)
- **Schedule**
- Field work would be conducted in early summer. We would issue a report before the end of August.

# Recommendations and Findings

- Provide an assessment as to salt and nitrate sources
- Possible fixes for the 6 wells
- Define an approach useful for assessing solutions for other wells
- Recommendations on salt practices