

# **Agenda and BSWCMC Discussions**

**Barnett Shale Water  
Conservation and Management Committee**

**November 11, 2009**

Sign In and...

... a Word from Pioneer

# Simplified Agenda

- **Introductory Remarks**
- **Environmental Issues Round Table**
  - **Noteworthy Issues**
  - **Continuing Updates**
- **Expansion of Membership to BSWCMC**
- **Break**
- **RPSEA Shale Gas Management Project:  
Status & Discussion of Milestones –  
Tom Hayes**

# Simplified Agenda

- **Task 4. Shale Gas Flowback Water and Produced Water Characteristics**
- **Task 6. Feasibility of Alternate Water Sources** - JP Nicot, BEG
- **Wrapup**
- **Adjourn**

# Environmental Issues Round Table

# **Environmental Issues Considerations**

- **Groundwater Conservation Districts**
- **Calls for environmental impact assessment for Barnett development?**
- **Shalegas Discussions in Congress: Central Issues Include Water**
- **VOC Management Issues**
- **Etc.**

# **Expansion of Membership to the BSWCMC**

# Possible Directions

- **Open membership to companies of other plays**
- **Rationale: Technologies and Methods of Barnett can be extended to other shale gas regions**
- **Considerations:**
  - **Outreach approach**
  - **Means of participation (Teleconferencing?)**
  - **Dues Structure**
  - **Etc.**



# **Status Since the Last Meeting**

- **Selected Priority Plays for Outreach**
- **Developed Lists of Shale Gas Companies in Each Play**
- **Call Each Company and Determine the Appropriate Contacts for Water Mgt**
- **Guage the Level of Interest**
- **Use Two-Pager Prospectus to Augment the Effort**
- **Continue the effort (Matt and Tom)**

# Targeted Plays

- Fayetteville
- Haynesville
- Woodford
- Eagle Ford

# Non-BSWCMC Companies in the Fayetteville

- **Anadarko**
- **Carrizo**
- **Chesapeake\***
- **ConocoPhillips\***
- **Devon\***
- **Edge Petroleum**
- **Marathon Oil**
- **Noble Energy**
- **Penn Virginia**
- **Petrohawk Energy**
- **Shell Oil**
- **Southwestern**
- **Storm Cat**
- **XTO\***

# Non-BSWCMC Companies in the Haynesville

- Cabot
- Chesapeake\*
- Cubic Energy
- El Paso
- EnCana\*
- EXCO
- Forest Oil
- Goodrich Petroleum
- Meridian Resources
- Noble Energy
- Petroquest
- Questar Corp
- Shell

# Non-BSWCMC Companies in the Woodford

- Bankers Petroleum
- Chesapeake\*
- Continental Res
- EOG\*
- Newfield
- Penn Virginia
- Petrohawk Energy
- Petroquest
- Southwestern
- St. Maryland
- Williams\*
- XTO\*

# Non-BSWCMC Companies in the Eagle Ford

- Apache
- TXCO Resources
- Pioneer\*
- Petrohawk

# Break

# **RPSEA Shale Gas Water Management Project: Status and Discussion of Milestones**

– Tom Hayes



# **New RPSEA Project on Shale Water Management and Reuse**

- **Coordinates closely with the BSWCMC**
- **Duration: 2 yrs.**
- **Total Budget: \$2.5 million**
- **Budget provided to meet with BSWCMC**
- **Tasks of Project require input and cooperation from BSWCMC companies**
- **A good measure of built-in flexibility for tech transfer and information dissemination.**

# Scope and Budget

Tasks	Description	Organizations	Budget
1 and 2	Project Planning for RPSEA	GTI	\$10,135
3	Technology Transfer	GTI	217,110
4	Water Char DatabaseGTI	GTI	87,139
5	Feas of FB Water Capture	Texerra	171,555
6	Alternate Water Sources	BEG	336,869
7	Engineering Decision Doc	GTI / Host Co's	114,537
8	Devel of EDR for FB Trtmt	GTI & Sub	397,433
9	Innov Membrane Coatings	U. Texas	568,055
10	Membrane Field Trials/ETU	GeoPure	278,209
11	Engineering Systems Anal	GTI	87,032
12	Program Mgt & Coord	GTI	136,712
13	Final Report	GTI	\$95,214

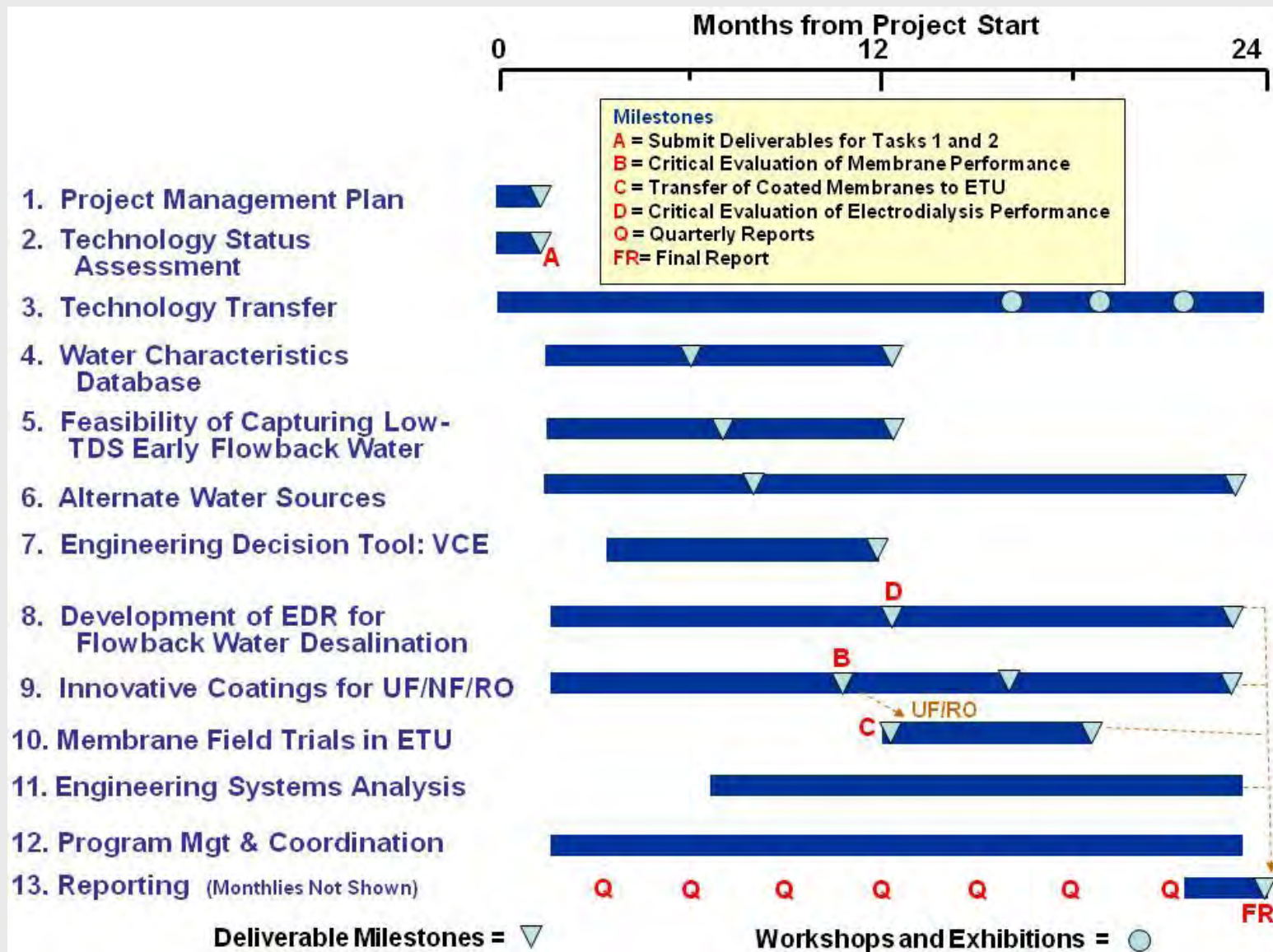
# **Deliverables**

- **Database on Shale Gas FB and PW Compositions**
- **Conceptual designs for low TDS FB water segregation and mgt**
- **Guidance Document on best practices for alternate water source utilization**
- **Engineering decision tool on evaporative treatment processing**
- **Electrically driven processing for low-energy partial demineralization**

# Deliverables

- **Topical Report: Capability of ED in selective removal of various constituents**
- **New generation of coated membranes with improved performance characteristics for UF, NF and RO: Extended Life, Lower Pressure Drop, etc.**
- **Topical Report: Field Performance Verification of Improved Membranes**
- **Final Report**

# Milestones



# Next Steps

- **Detailed Performance Metrics for Go/No-Go Milestones (Discussions involve PI's)**
- **Establish Performance Targets for the Development Efforts for Membrane Coatings and Electrodialysis**
- **Meet RPSEA Timetable for Deliverables**

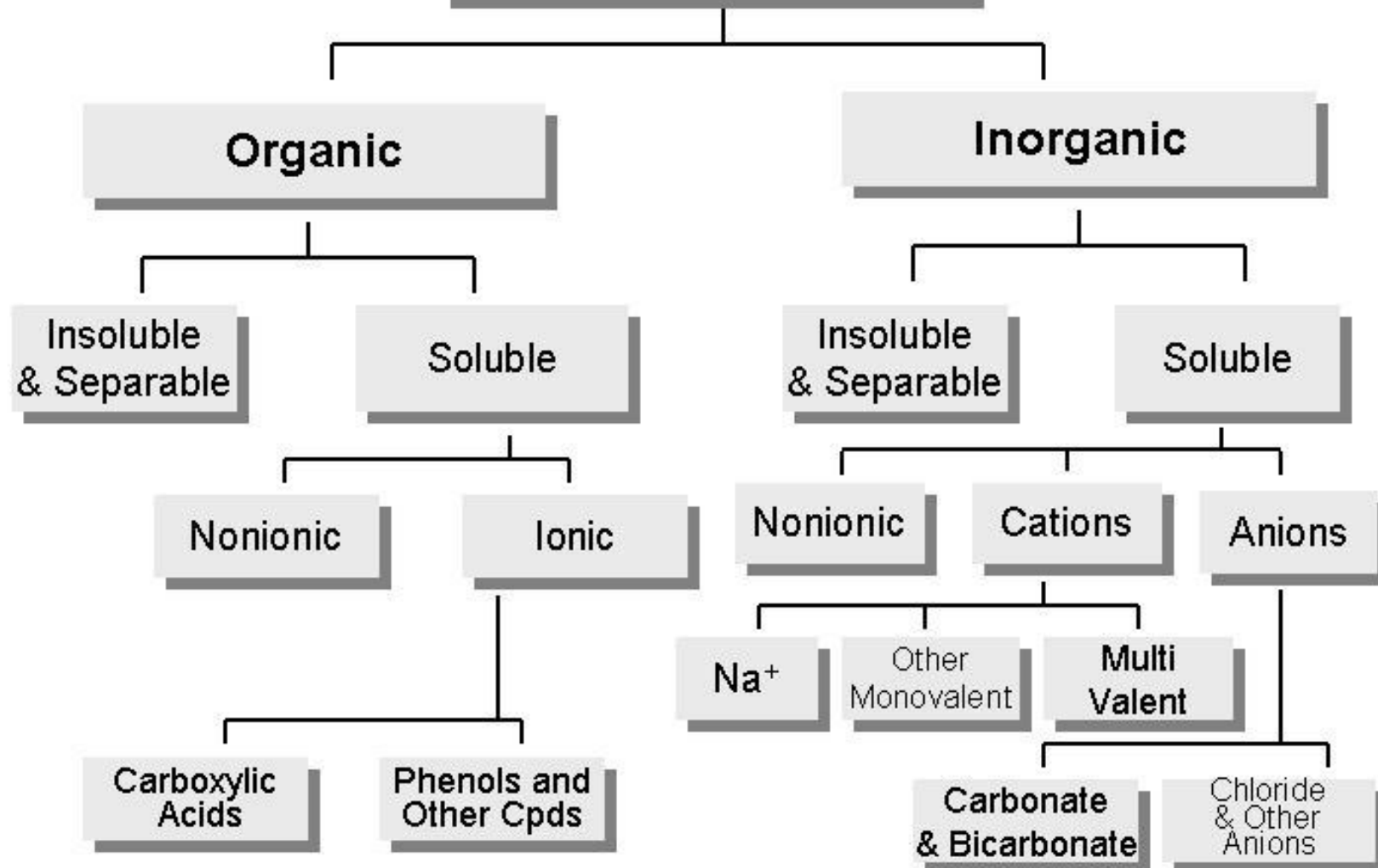
# Flowback and Produced Water Characteristics Database – Tom Hayes

# Chemistry and Composition of Flowback Water



# Complex

## Produced Water Constituents



# **Components in Flowback Water**

**Constituents of Produced Water**

**+**

**Frac Job Additives**

**Sand**

**Friction Reducer**

**Oxygen Scavengers**

**Corrosion Inhibitors**

**Scale Inhibitors**

**Biocides**

# **New Effort for the Sampling and Analysis of Marcellus Flowback Water**

- **Funding from MSC and ASWCMC Industry Consortia**
- **Sampling from 19 locations**
- **Conducted in 2009**
- **Includes general chemistry and detailed analysis of constituents of interest**
- **Lists of Constituents of Interest provided by the USEPA, WV-DEP and PA-DEP**
- **Over 250 determinations are performed on each sample**

# Approach

- **Samples to be taken at 0, 1, 5, and 14 days following the frac job at each of the selected locations**
- **Sampling at Day 0 is influent water with chemical additives before sand addn.**
- **Uniformity of sampling and analysis**
  - **Standardized Plans (FSAP, QAPP)**
  - **Sampling performed by URS**
  - **Analyses performed by one lab (Test America)**
- **Two lists of constituents for analysis**
  - **Extensive List applied to two samples/location**
  - **Less extensive list applied to other samples**

# **Classes of Measurements for Marcellus Flowback Water**

- **General Chemistry**
- **Volatile Organics**
- **Semivolatile Organics**
- **Pesticides**
- **Organophosphorus Pesticides**
- **PCBs**
- **Metals**
- **Radiological Determinations**

# What Makes Sense to Measure in Barnett FB and PW?

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# Path Forward

- **Coordinate this effort with Task 5 (Feasibility of Early FB Water Capture).**
- **Prepare Sampling Plan**
- **Coordinate This Task with the MSC Project**
- **Contact Test America and Discuss Costs of Determinations.**

# Feasibility of Alternate Water Sources – JP Nicot

# Wrapup

## Proposed Agenda Items for the Next Meeting

# Future Agenda Items

**Proposed Date for  
Next BSWCMC Meeting**

**Jan 13**

- **Content of the Next Meeting**
  - **RPSEA Project Speakers**
  - **Other Speakers?**
  - **Format and Topics**
- **Technology Screening Team**
- **Steering Team**

THANKS PIONEER  
RESOURCES



# Adjourrn