

# **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 Database	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

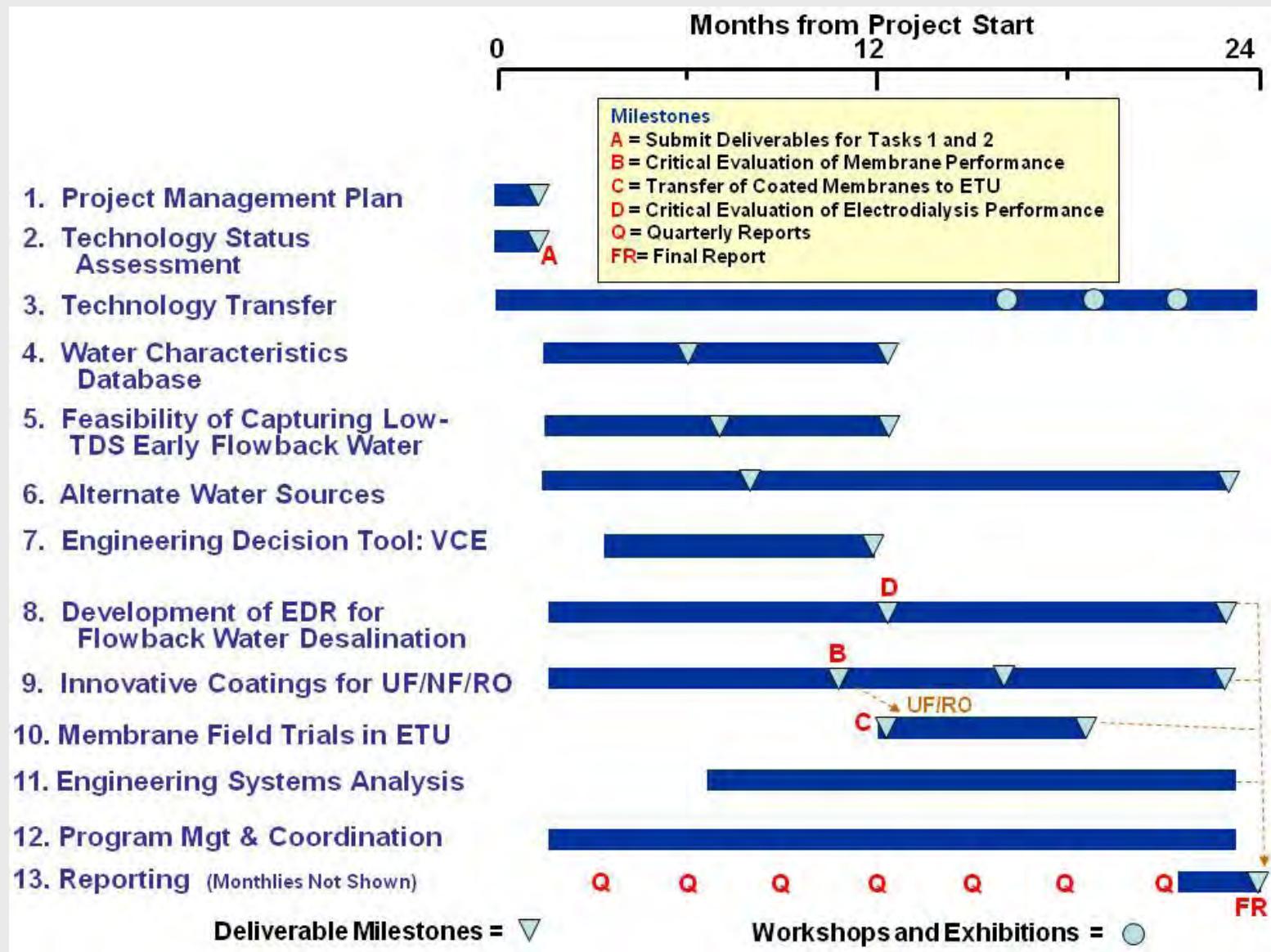
# Deliverables

- 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

### Organic

Insoluble & Separable

Soluble

Nonionic

Ionic

Carboxylic Acids

Phenols and Other Cpd's

### Inorganic

Insoluble & Separable

Soluble

Nonionic

Cations

Anions

Na<sup>+</sup>

Other Monovalent

Multi Valant

Carbonate & Bicarbonate

Chloride & Other Anions

# 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**

# Adjourn