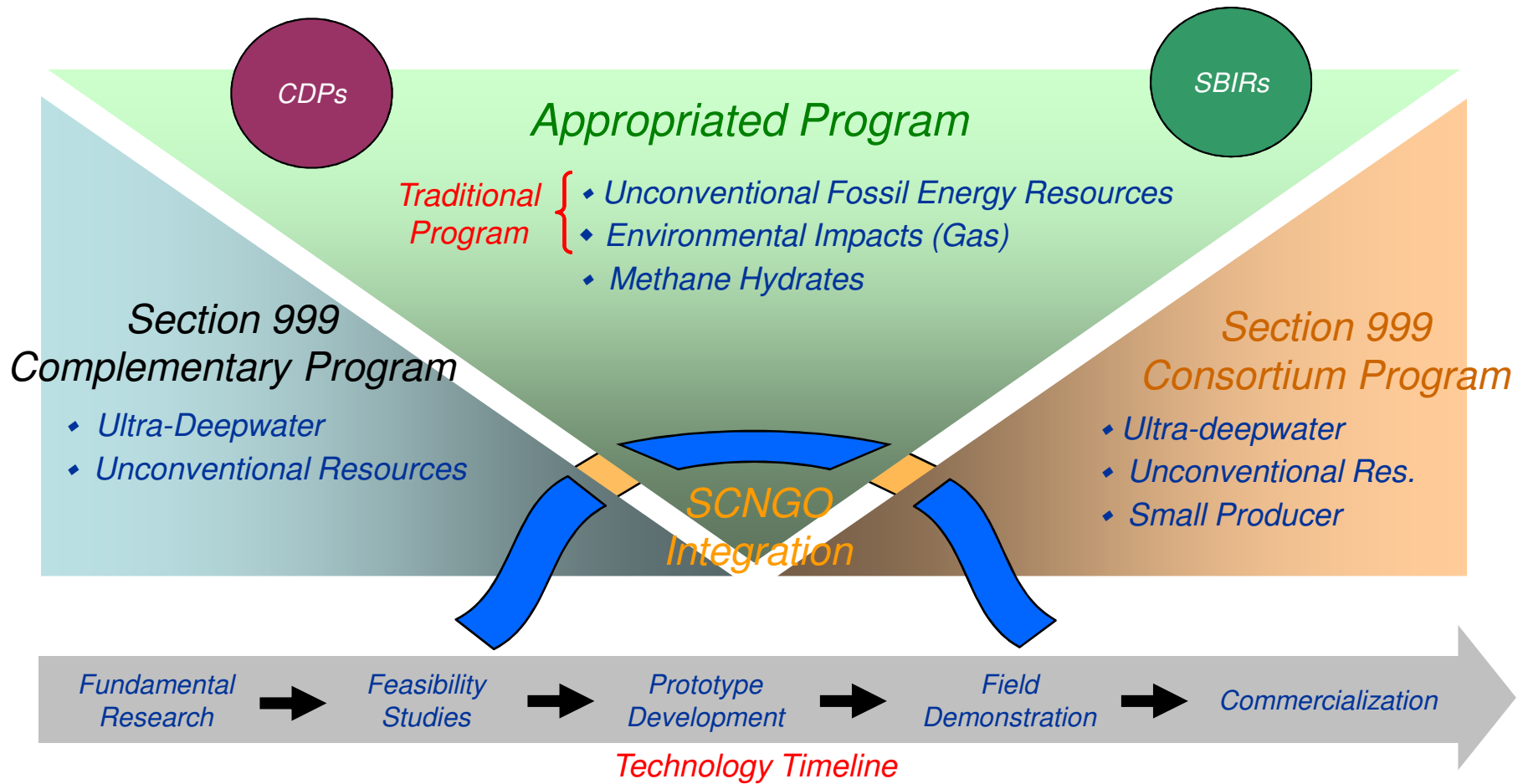


NETL-SCNGO Oil and Gas R&D Program



Multi-agency Collaboration

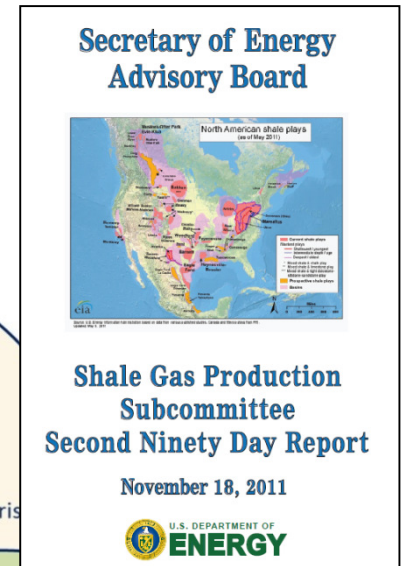
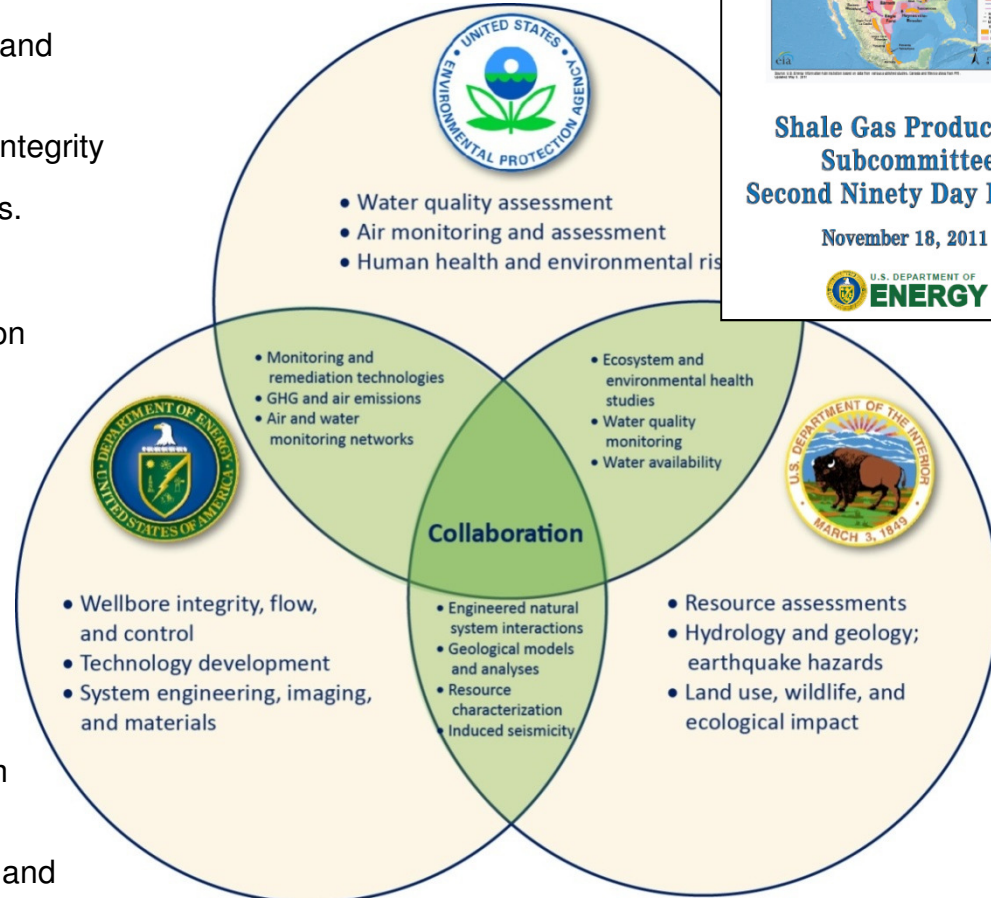
Multi-year plan in development

Minimizing the EHS impacts of shale gas development

- Resource Characterization: nature, variability, and linkages to EHS impacts
- Water Quality: treatment, disposal, well-bore integrity
- Water Quantity: smart use, alternative sources.
- Air Quality/GHG: traffic, fugitive emissions.
- Induced Seismicity: during wastewater injection
- Ecosystems: fragmentation, noise, light
- Human Health: topics still under discussion

DOE Focus

- Development and implementation of Technological Solutions (impact avoidance and mitigation)
- Analyses of various aspects of energy system performance and subsurface modeling
- Scientific contributions to field data collection and interpretation, including laboratory studies

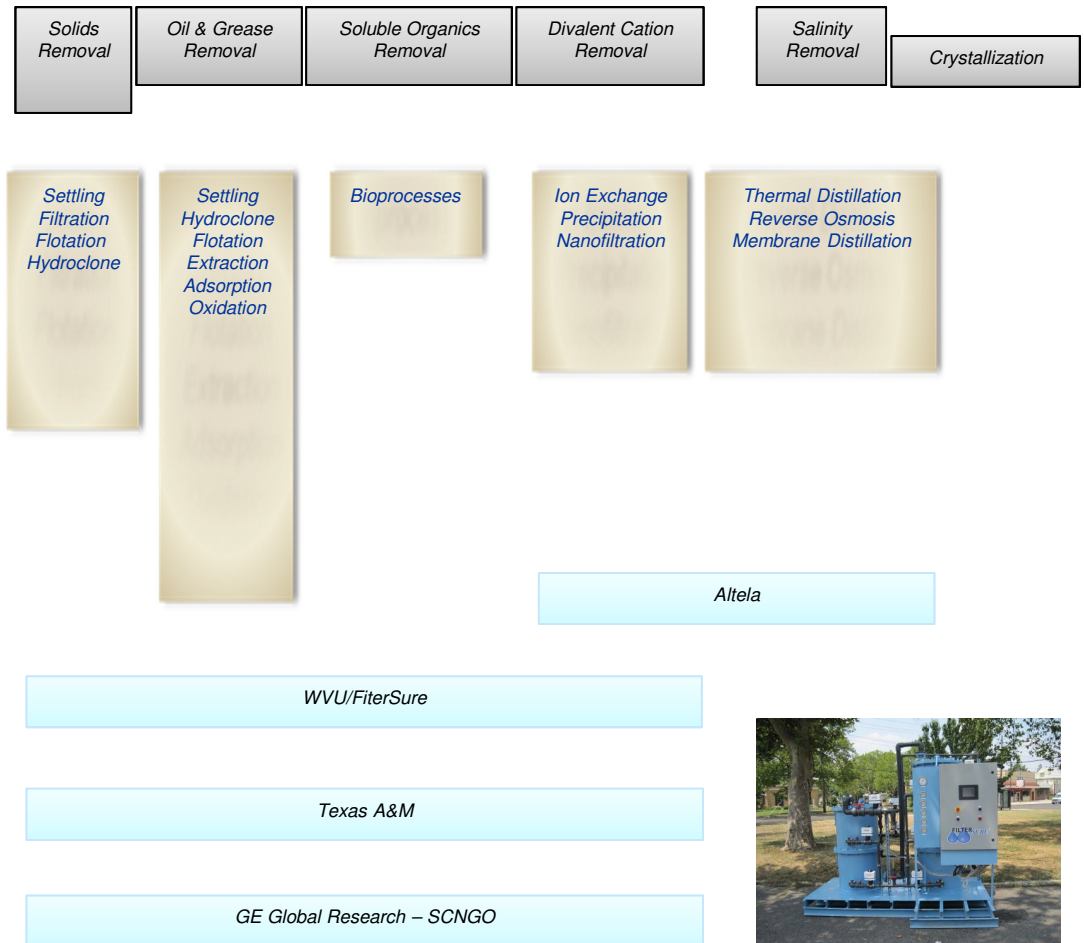


Extramural R&D Portfolio

Natural Gas (Environmental) Program through 2012

- **Implement cost effective and environmentally benign water management practices (supply, handling, treatment, and disposal)**

- Ensure that fresh makeup water supplies are acquired in an environmentally benign manner
- Minimize the volume of fresh water required through recycling of fracturing water
- Design water supply/handling systems that are both cost efficient and environmentally benign
- Cost-effective cleaning of flowback or produced water for re-use or surface disposal



GroundWater Protection Council

- Developing reporting and data collection tools available to a wide range of users
- **Risk Based Data Management System (RBDMS) – Hydraulic Fracturing module**
 - *Well completions, casing, cementing, fracturing fluids*
 - *Linking well locations to water-relevant data*
 - *22 states use RBDMS to aid reg. agencies and provide information to the public*
- **FracFocus website (w/ IOGCC)**
 - *11 states require reporting through FracFocus*
 - *37,000 disclosures on frac fluid composition*
- **Facilitate STRONGER reviews**
- **Expanded coordination with EIA; further connectivity between RBDMS and FracFocus**



Looking for information about a well site near you?



Search for nearby well sites that have been hydraulically fractured to see what chemicals were used in the process.

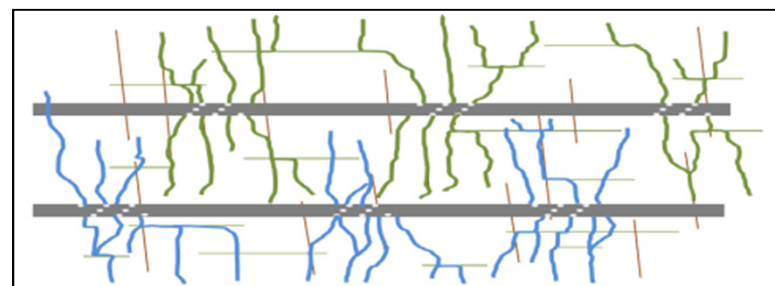
TOTAL WELL SITES REGISTERED **5 2 4 4 6**

FY2012 Projects

Two projects added and underway

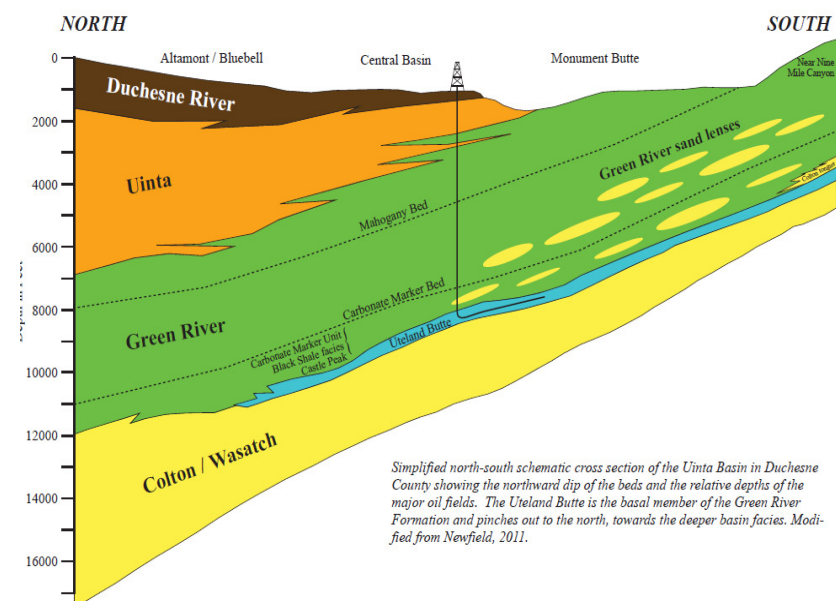
- **New Generation Hydraulic Fracturing Model for Horizontal Wells.**

- U. Texas-Austin
- Model the generation of non-planar fractures from multiple perforations: provide more robust realizations of SRV for reservoir simulation and development planning (spacing, timing, etc.)
- Oct. 2012 to Sept 2016
- \$1038K DOE



- **Liquid-rich Shale Potential of Utah's Uinta and Paradox basins**

- Utah Geological Survey
- Geologic/Geomechanical characterizations of the Green River formation (ex. Uteland Butte Mbr) and Cane Creek Fm (PB)
- Oct 2012 to Sept 2015
- \$738K





FY2013 Natural Gas (Environmental) FOA

- **General**

- *~\$7,000,000 available*
- *Selections coordinated with RPSEA*
- *Final Announcements and Notifications of awards are still pending.*

- **Topic Areas**

- *Area 1: Reduced Footprint of UOG Development*
- *Area 2: Assuring, Monitoring, and Mitigating Issues Related to Methane Emissions, Wellbore Integrity, and Zonal Isolation (Protecting shallow groundwater resources)*
- *Area 3: Reducing Water Usage and Resource Degradation through Smarter and Less Water-Intensive Unconventional Resource Stimulation*