



ENVIRONMENTALLY FRIENDLY DRILLING SYSTEMS PROGRAM

FRAC FLOWBACK BRINE TREATMENT

Reducing the impact of hydraulically fracturing gas shales

The **Environmentally Friendly Drilling (EFD)** program, managed by the Houston Advanced Research Center (HARC), integrates advanced technologies into systems that significantly reduce the footprint of petroleum drilling and production in environmentally sensitive areas. The objective is to identify, develop and transfer critical, cost effective, new technologies that can provide policy makers and industry with the ability to develop reserves in a safe and environmentally friendly manner.

The program continues to add participants from environmental organizations, academia, state and federal agencies, government laboratories, and industry. Currently over 100 organizations support this effort including financial assistance. The partnership identifies new technologies and transfers them to areas that must incorporate new practices to address environmental concerns. Regional partners optimize technologies to fit the needs of their locale. Partners routinely come together to discuss progress with the sponsors/advisors. The program was honored with the Environmental Partnership Chairman's Stewardship Award from the Interstate Oil and Gas Compact Commission at their 2009 annual meeting.



Field Trials and Demonstrations of New Produced Water and Frac Flowback Brine Treatment in the Eagle Ford Shale Play

One of the petroleum industry's goals is to reduce the environmental impact of operations in environmentally sensitive areas. As a result of this effort, a number of Environmentally Friendly Drilling (EFD) technologies have been developed to varying degrees but few have been integrated into a field demonstrable drilling system (i.e., combination of technologies) compatible with ecologically sensitive or off-limits areas.

The EFD TIP (Technology Integration Program) is planning to create a proving ground in South Texas' Eagle Ford Shale play for the new water treatment and re-use technologies. A number of these water treatment business ventures are joining Texas A&M's team (*GPRI Designs™ Desalination Technology*) to prove out the technology and to provide documented data for pilot plant, field trials, and potentially full scale commercial operations. This task is supported by MI SWACO, Dow Chemical, 212 Resources, and Water Resources Company. Details are at http://www.EFD_TIP.org

The specific tasks in the Eagle Ford will be to perform tests on frac water flow back and produced brine to identify the required level of treatment that is best for re use in subsequent fracturing operations. The proving ground concept allows this group to share information collected by the TIP team (basic water chemistry, water needs, logistics) and to have access to field sites in South Texas provided by landowners and operators. Sponsors and supporters are providing sites on their ranches and at their sites. Deliverables will be provided at various times during the project. Field tours to sites to review operations will be coordinated by Texas A&M, who will be providing the mobile lab to support the trials.

Description of Project



Mobile Test Unit for Advanced Membrane Testing



Interior of unit, set up for membrane modules

The technology for treatment and re-use of produced water has been developed over the last 10 years by the A&M team. New technology for pre-treatment of brine lends itself to other water treatment processes as well by reducing hydrocarbon content in brines, removing solids, and reducing the “hardness of brines before re-use.

One of the keys to successful water treatment and re-use is to have accurate and affordable analysis of the brines to be treated (composition determines the type of treatment to use) and the content of the “product water” produced from those treatments. To provide these services, Texas A&M’s Agri-Life Research Centers (see: <http://agriliferesearch.tamu.edu/>) and the Texas A&M School for Rural Public Health’s Health Sciences Center in McAllen Texas (see: <http://www.srph.tamhsc.edu/mcallen/index.html>) are planning to provide support services for organizations active in the Eagle Ford Shale.



The McAllen Campus has been housed in a 23,000-square-foot facility providing space for laboratories, offices, classrooms and conference areas used to deliver a wide range of health training, clinical research, medical education, community interventions and public health programs with local partners

More information on any of these technologies is available at <http://www.efdsystems.org> and <http://www.gpri.org/desalination>

Contacts

David Burnett
GPRI
Texas A&M University
979 845 2274
Burnett@pe.tamu.edu

Rich Haut
Houston Advanced Research Center
281-364-6093
rhaut@harc.edu

Environmentally Friendly Drilling Program

For 20 years, we have worked to reduce our environmental footprint. Remarkable progress has been made.

The program has shown we can **reduce the footprint more than 90%** with a further reduction in the impact on the environment if low impact technologies are combined in a system.

From the past...
(multiple well sites)



...to the present drill site pad
6 times smaller and able
to access multiple wells
from **ONE** location



System includes:

- Modular small footprint rigs with reduced emissions.
- Pad drilling of multiple wells from one site.
- New downhole logging and steering tools.
- Closed loop drilling fluid systems.

Managed by the Houston Advanced Research Center (HARC), Texas A & M University, Sam Houston State University and TerraPlatforms LLC
www.efdsystems.com

The project has been co-funded by the DOE National Energy Technology Laboratory, Research Partnership to Secure Energy for America (RPSEA), industry and environmental organizations.

SPONSORS



MANAGEMENT TEAM



ENVIRONMENTAL ORGANIZATIONS



COLLABORATORS



ALLIANCE MEMBERS



For further information about the EFD Program contact:

Rich Haut
Houston Advanced Research Center
rhaut@harc.edu
(281) 364-6093

Tom Williams
twilliams@afsolutionsinc.com
(713) 201-3866

Dave Burnett
Texas A&M University
burnett@pe.tamu.edu
(979) 845-2274

Gene Theodori
Sam Houston State University
glt002@shsu.edu
(936) 294-4143

www.efdsystems.com