Creating a Culture of Environmental Awareness
The EFD Program

Addressing Environmental Issues and Increasing Environmental Awareness
The EFD Team

Co-funded by RPSEA, US Fish and Wildlife, Industry, Environmental Organizations

MANAGEMENT TEAM

ENVIRONMENTAL ORGANIZATIONS

COLLABORATORS

SPONSORS
EFD Program

A collaborative effort

Industry
Academia
Government
Environmental Organizations

Team Formed in 2005

Mission
Provide unbiased science to identify, develop and transfer critical, cost effective technologies that provide policy makers and industry with ability to develop reserves safely and environmentally friendly.
EIGHT YEARS OF INNOVATION
EFD CURRENT EFFORTS

- Invasive Species
- Water Screening Kits
- Fugitive Emissions
- Wireless Data Loggers
- Soil Impacts
- Temporary Roads
- Adv. Analytics
- Livestock Impacts
- Stray Gas
- Correcting Misinformation
- Nat Gas Pwr
- GIS Tools
- Measuring
- Education and Outreach
- Produced Water Trmt
Safety success has been accomplished by leadership, documenting, measuring and training.

To achieve the same success in environmental performance will require leaders to also make this a core value.

Our objective:
Sequel: “Environment 24/7 – building a culture of environmental awareness.”
Safety Pyramid

Environmental Pyramid

Mankind

Society

Community

Group/Organization

Family

At-Risk Behaviors

You

Near Hit

Recordable

Lost Time Injury

Fatality

At-Risk Behaviors
Survey by the Center for Climate Change Communication: George Mason University

Do You Think Global Warming will Harm (great deal) . . .

- Future Generations of People: 47%
- Plant/Animal Species: 43%
- People in Developing Countries: 35%
- People in Industrialized Nations: 26%
- People in the U.S.: 26%
- Your Community: 26%
- Your Family: 19%
- You: 18%

16%
1. Create a sense of urgency
2. Form a guiding coalition
3. Create a vision
4. Communicate the vision
5. Empower others to act on the vision
6. Create quick wins
7. Build on the change
8. Institutionalize the change
STEPS TO MOTIVATE

Clear Goals & High Expectations
STEPS TO MOTIVATE

Praise for Progress
(and people begin to change behaviors)
STEPS TO MOTIVATE

Courage to Keep Going
Priorities are subject to change.
Values are fundamental.
CoMMiTTMENT

Level 1
Comply when convenient

Level 2
Comply when I have to

Level 3
Believe for me and my family

Level 4
Believe for me, family and teammates

\[ E = mc^2 \]
ENVIRONMENTALLY CONSCIOUS OPPORTUNITIES

E – Environmental
C – Conservation
O – Opportunity

E – Environmental
C – Conditions
O – Opportunity

E – Environmental
C – Conversation
O – Opportunity
ENVIROMENTAL CONVERSATION
OPPORTUNITY

1. Observe
2. Accentuate
3. Explore
4. Emphasize
5. Agree
6. Employee Buy-in
EFD Scorecard

- Air
- Water
- Site
- Waste Management
- Biodiversity / Habitat
- Societal
Objective

Develop a workforce skilled in environmental mitigation.

Interfacing with Ralph & Rhonda Roughneck users explore a virtual rig.
“UNLESS SOMEONE LIKE YOU CARES A WHOLE AWFUL LOT, NOTHING IS GOING TO GET BETTER, IT'S NOT.”

- The Lorax
The Environmentally Friendly Drilling System Scorecard

The EFD certification system is a voluntary, consensus-based, rating system based on existing, proven technologies. The process evaluates environmental and societal issues associated with energy development. It is based on accepted principles and seeks a balance between energy development and all living systems.

The EFD Scorecard is organized into six attributes: Air, Site, Waste Management, Biodiversity/Habitat, Water and Societal. It is a performance-oriented system where points are earned for satisfying criteria. Different levels of certification are awarded based on the total points earned. The system is comprehensive in scope, yet simple in operation.

“What gets measured, gets done.”

EFD Scorecard – Online!  
www.efdscorecard.org

Scorecard Guide, Scoring Matrix, Training Module and more!
New Project: Addressing Gas Flaring by Utilizing Novel Technologies to Monetize Gas at the Wellhead

The Eagle Ford Shale as seen from space at night, Dec, 2012

Green dots indicate existing oil wells. Red dots indicate gas wells. Blue dots are permitted locations.
New Project: Addressing Gas Flaring by Utilizing Novel Technologies to Monetize Gas at the Wellhead

Gas Techno® Process

Methane ➞ Methanol + Ethanol + Formaldehyde

Methane

CO + H2 (Syngas)

Methanol

Formaldehyde & Ethanol

Products Include:
- Alternative Fuels
- Plastics & Resins
- Consumer Products
- Many, many more...

Electratherm Supplied Equipment

- Natural Gas is Turned Back On at a Stranded Natural Gas Well
- Wellhead Energy System's Breakthrough Process Cleans & Compresses the Gas
- Clean Natural Gas Powers a Combustion Engine and Drives a Generator
- Generated Electricity then...
- Flows to the Power Grid for Sale to Utilities
- Or Provides Primary or Backup Power for Municipalities
- Or Powers a Manufacturing Plant On-Site

GAS SOURCE | GRIDFOX ENERGY CONVERSION STATION | END USER

- High CO2 Possible
- Air cooled condenser
- Expansion tank
- Natural Gas source for flare
Objective

Create and implement a program to develop a workforce skilled in environmental mitigation of exploration and production impacts.
EFD Virtual Site

Hydraulic Fracturing Site

Well Pad

Gas Processing

Seismic Survey

Next Steps
# Powered by Natural Gas

**Utilizing Natural Gas as a Primary Source for Equipment Used in Drilling and Hydraulic Fracturing**

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- **Regulatory**
  - Engine Certification
  - Fugitive Methane
  - Fuel Storage & Transport

- **Issues**
  - Operational Requirements
  - Engine Technology
  - Gas Quality
  - Fueling Technology
  - Engineering Barriers
  - Logistics/Supply
Supporting R&D and Field Test Projects

- Assessment of the environmental, performance and economic benefit of a Newpark water-based drilling fluid in the Marcellus & Utica Plays.

- National Oilwell Varco - Identify and Measure the Environmental Impact of Onshore Drilling - to determine how resource development can occur without negatively impacting the environment.

- Dopeless® Technology is an Environmentally Friendly Drilling practice which can substantially reduce negative environmental impacts and promote balance between nature and energy development. Perform tests involving participating operators, understand the impact of Dopeless® Technology in casing, related to impact on running speeds, elimination of pipe dope at the rig site, other operational issues. Quantify/evaluate it.
Hydraulic Fracturing Chemical Registry

- Developed/managed by GWPC
- Provide Transparency
- Protect Groundwater
- Engage Public
  - Explain hydraulic fracturing process
  - Provide well information

www.fracfocus.org
FracFocus 2.0 Training Module

Training on FracFocus 2.0

Funding for development of this training was provided by the Independent Petroleum Association of America (IPAA)
• EFD Web Sites
  • Information related to field trials (reports, videos, graphics, results)
  • Access to information from other RPSEA funded efforts
  • Workforce Development Tool

• Monthly newsletter
• Presentations, Exhibits, Technology Outreach
• Best Practices: www.oilandgasbmps.org
Utilizing the EFD Alliance Network

- Invasive Species
- Water Screening Kits
- Fugitive Emissions
- Wireless Data Loggers
- Soil Impacts
- Temporary Roads
- Adv. Analytics
- Livestock Impacts
- Stray Gas
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- Produced Water Trmt
EFD Field Trials
Eagle Ford Shale Play, Western Gulf Basin, South Texas

Eagle Ford Shale Producing Wells
BOEPD
- 0 - 250
- 251 - 750
- 751 - 2,500
Gas-Oil Ratio (Mean per Mo.)
- 0 - 1,000
- 1,001 - 6,000
- > 6,000
Eagle Ford Petroleum Window
- Oil
- Wet Gas/Condensate
- Dry Gas

Eagle Ford Shale Drilling & Production
2006 - 2010, South Texas

Eagle Ford formation
Though named for a North Texas community where the shale is visible, the Eagle Ford shale formations' oil and gas production is mostly confined to South Texas counties.

Western Gulf Basin

Map Date: September 28, 2011
US consumed more natural gas than it produced in 2011, with net imports of almost 2 trillion cubic feet.

As domestic supply has increased natural gas prices have declined, making the United States a less attractive market and reducing U.S. imports.

Conversely, lower prices have made purchases of U.S. natural gas more attractive, increasing exports.

Production growth, led by increased development of shale gas resources, outpaces consumption growth.

As a result, exports continue to grow at a rate of about 17.7 percent per year from 2020 to 2040.

Net exports in 2020 are less than 1 percent of total consumption; in 2040 they are 12 percent of consumption.

U.S. natural gas production increases by about 1 percent per year from 2011 to 2040, meeting domestic demand while also allowing for more exports.

The prospects for future exports are highly uncertain, however, depending on many factors that are difficult to anticipate, such as the development of new production capacity in foreign countries, particularly from deepwater reservoirs, shale gas deposits, and the Arctic.
IT'S NOT SO HARD TO BE GREEN

Questions?

Thank you

www.environment247.org
www.efdsystems.org
www.efdvirtualsite.org
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