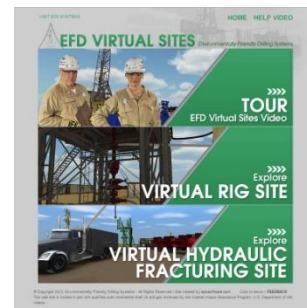


The EFD Virtual Site

www.efdvirtuallsite.org

The Environmentally Friendly Drilling Systems (EFD) program, managed by the Houston Advanced Research Center (HARC), provides unbiased science to identify and transfer cost effective technologies that can develop natural resources in an environmental friendly manner. EFD has alliance partners with over thirty universities and national laboratories across the U.S. We also work with numerous operators and service provider companies, as well as environmental organizations and NGOs.

One of the areas of focus within the EFD Program is to create and implement a workforce program to develop a workforce skilled in environmental mitigation of exploration and production impacts. In order to reach the largest audience, the EFD Team developed a free, educational tool, the **EFD Virtual Site** (www.efdvirtuallsite.org), using gaming software in order to interactively engage current and future energy employees, geologists, and environmental specialists, promoting environmental stewardship to all stakeholders. The **EFD Virtual Site** offers visitors the options to ‘Tour’ by watching a short video that explains the oil and gas process, history, and terminology, or ‘Explore’ by visiting either the Virtual Drilling Rig or Virtual Hydraulic Fracturing Site. Working with industry, environmental organizations, and academia, the Virtual Rig was launched in 2012. In 2014, the EFD Virtual Hydraulic Fracturing site was released. Visitors to the EFD Virtual Site can walk around an active drill and hydraulic fracturing site like they’ve never done before. Processes and technologies are explained in terms understandable and relatable to all levels of experience. The EFD Team is now developing the latest edition to the Virtual Site with a Virtual Production Site. The EFD Virtual Site is frequently used at the Petroleum Academies (High Schools) that are sponsored by IPAA/PESA by students to increase their awareness of the industry.



As users walk around the site, inside the dog house, on the rig floor and amongst the necessary equipment, they will encounter various ‘hotspots.’ The hotspots glow green so that the user can click on it to learn about the equipment or practice as well as environmentally friendly alternatives, read informative literature and/or case studies, and find various resource links with more information. Several hotspots include videos; while others have 3D rotation so those interested can see the equipment from all angles. Web resources on the Hydraulic Fracturing site include FracFocus. FracFocus is the national hydraulic fracturing chemical registry and is managed by the Ground Water Protection Council and Interstate Oil and Gas Compact Commission, two organizations whose missions both revolve around conservation and environmental protection.

The EFD Virtual Site was a Finalist in the 2014 World Oil Awards for Best Outreach Program. The program was named again in the 2015 World Oil Awards. In 2015, the EFD Program received the Southwest & Midcontinent Oil & Gas Award for Excellence in Environmental Stewardship, specifically recognizing the EFD Virtual Sites for distinction in outreach and technology transfer.



Time, geography, and cost are factors that might inhibit the efforts for many wishing to learn more about the O&G industry and the myriad lower impact technologies and practices that exist today. One of the aspects that makes the EFD Virtual Site so innovative is that the users themselves determine where they go on the virtual rig and fracturing site, as well as what they click on to learn more about, thus increasing their knowledge retention. Upon roll out of the Virtual Production Site, more users will know about the many criteria inspectors review on sites across the state.

Benefits of the Virtual Site include a workforce that may more easily identify and mitigate potential impacts to the environment within energy development. Since it is free to use for all, knowledge and skills vital to personal and environmental safety will continue for generations to come.

The benefits of the EFD Virtual Site are significant. Developing environmental stewardship in the O&G workforce presents various challenges that are addressed with our site. Schedules are not impacted because this free educational tool is available online 24 hours a day. Through the use of a portable kiosk, the Virtual Site has been shared with thousands of folks across Texas at conferences, exhibits and workshops. Additionally, numerous studies have indicated that interactive pedagogy is more effective in regards to learning and retention. Because this site is interactive, users can learn and retain the skills crucial to short and long term environmental and individual protection.



EFD Team members, Industry Sponsors and our University and National Laboratory Alliance members have served as subject matter experts for the development and sharing of the EFD Virtual Site.

So that all stakeholders are engaged, we continue to seek feedback from industry, educators, students, regulators, and environmental organizations about updates to the site.

The EFD program integrates technologies into systems that address environmental issues associated with petroleum drilling and production operations in environmentally sensitive areas. One of the many positive outcomes of the program's mission is tremendous public outreach endeavors. EFD's successful Virtual Site has been requested as presentations at numerous education and outreach efforts amongst industry and academic institutions. Providing the impetus for O&G workers to expand their knowledge and training benefits all stakeholders. A workforce skilled in environmental stewardship will further establish the United States and Texas specifically, as a leader in energy development.

This project began in 2011, with roll out of the initial Virtual Drilling Rig in 2012. The Hydraulic Fracturing site was launched in 2014. The Production Site will be released in mid-2016. Because technologies and new best practices change, improving oil and gas development, updating the EFD Virtual Site to share more hotspots with newer case studies, videos, regulations, and web resources would allow the site to remain relevant and valuable to not only O&G employees, but also the communities in which development is taking place. Funds are continually sought to update the site.