



IPAA Strategic Planning Conference on Land Access and Environmental Issues

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Presentation Outline

Discussion on a Proposed Project and Approach -Project Title:
Survey of Methane Emissions from Marginal Wells and Associated Operations

- **Background for this Study**
- **Timeline**
- **Project Team**
- **Goals**
- **Meeting with EPA Discussion**
 - **Observations**
 - **Confidence in quality methods to acquire data and data quality**
 - **IPAA/industry interest in this study**

About RPSEA – The History

- Founded in 2002
- Unique 501(c)(3) Non-Profit, national consortium currently consisting of:
 - Over 100 members from:
 - the nation's premier research universities, five national laboratories, other major research institutions, not for profit energy and environmental organizations
 - large and small energy producers
 - activities in 21 states
- Energy Policy Act 2005 established the *Ultra-Deepwater and Unconventional Natural Gas and Other Petroleum Resources Research and Development Program*
 - RPSEA selected to manage a 10-year, \$350 million program through the DOE National Energy Technology Laboratory (NETL)
- RPSEA research focused on three program areas:
 - Unconventional Resources
 - Ultra-Deepwater
 - Small Producer

Accomplishments

We provide objective, sound science and the technology to achieve our mission

- **Managed over 170 Projects – several are already commercial**
 - Improved safety, reduced environmental risks, increased energy security
 - Created jobs – *direct impact on industry of over \$150 billion*
 - Protected environment – *damage mitigation of over \$40 billion*
 - Effective Technology Transfer
- **Developed Technology to Address Onshore Oil and Gas Development**
 - Goal to reduce the cost and increase the efficiency of exploration for and production of unconventional resources, while improving safety and minimizing environmental impact
- **Performed Research, Development and Demonstration Efforts including a program for Small Producers – (focus included Marginal Wells)**
 - Improved oil recovery, produced water, improved practices, methods to reduce costs, environmental performance

How the study was initiated

I was chair of the IOGCC Energy Resources, Research and Technology (ERRT) Committee before I became RPSEA President August 2016

My goal as ERRT chair: 1. Value of marginal wells and the threat to access with the downturn and the associated environmental and economic problems related to abandonment. 2. Technology transfer study focused regulators to improve adaptation of new technologies

When I became RPSEA President, my goals were reauthorization of the program, improve communication, broaden our member base, and an objective to improve our relationship with key stakeholders – associations, (small and mid size) independent producers and regulators.

This proposed study for me was an easy way to connect these dots between the work I was doing with IOGCC and RPSEA

IMPACT OF MARGINAL WELLS (IOGCC MW STUDY)

Marginal wells produce more oil than we import from the middle east

Conventional/marginal wells provide access to twice as much oil as we have produced. Storage and IOR opportunity for CO₂, (low price adds challenges for operators and states regarding abandonment, risk of orphaned wells/ where access to wells is important!). (*Risk vs opportunity*)

Challenge: Independents do not have the resources to conduct R&D.

R&D (RPSEA type program) is needed to help maintain/increase production, manage produced water, reduce OPEX cost (including environmental and regulatory compliance)

MW Study reviewed the economics of various State and Federal incentives and regulations (like and bonding, credits and regs like LDAR requirements/ OOOOOa).

The MW Study raised the question on emissions from marginal wells

Reviewed regs and the data used by EPA for the basis of this rule and the lack of representative data from marginal wells.

- ▶ Looked at compliance costs
- ▶ Reports used in the rules lacked real data

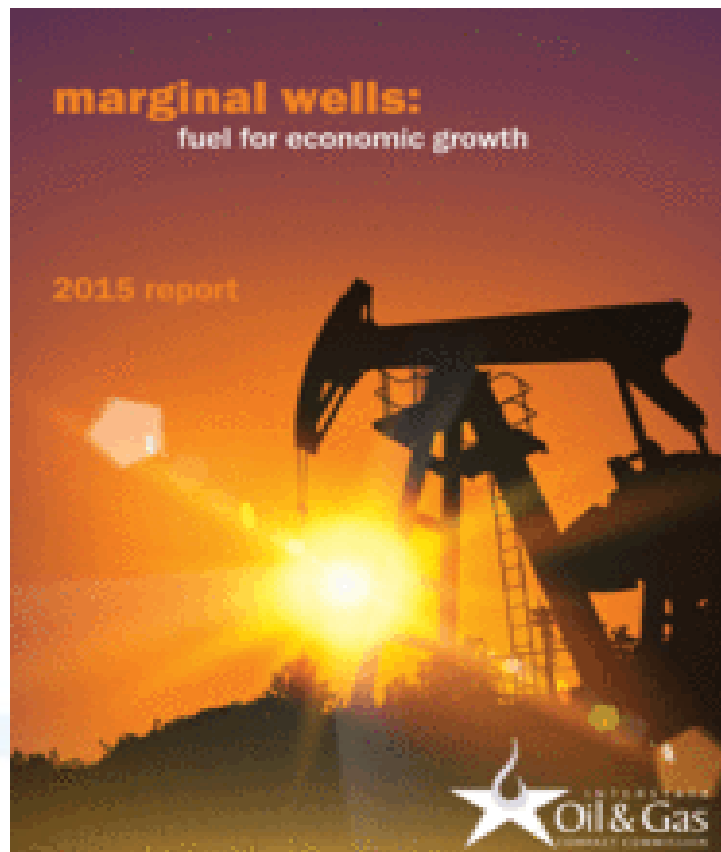
IOGCC 2015 MARGINAL WELL REPORT

IOGCC MARGINAL SURVEY 1992-2015

*(*IOGCC uses a 10 barrel per day definition of a marginal well)*

IOGCC Committee Marginal Well Study
(utilized RPSEA members, data and affiliation
of State Oil and Gas Associations and IPAA)

Report shows the rule if applied to any marginal
wells would cost jobs, states, could have an
adverse impact on the environment



Proposed Study

Project Title:

Survey of Methane Emissions from Marginal Wells and Associated Operations

Project Team:

Based on prior work funded by RPSEA to develop air quality testing protocols

RPSEA, HARC, GSI Environmental

RPSEA Members on Regional Basis – the data collection team (primarily University Based, i.e. TAMU, CSM, WVU, Utah) this may also include US Department of Energy – National Energy Technology Laboratory

Objective:

Accepted methods and protocols for measuring methane emissions

Defensible, repeatable sound measurements of methane from representative marginal wells/operations in at least 3 regions

Meetings

Meeting with EPA 1/24

David Cozzie, Group leader (fuels)

Brenda Shine

Alex MacPherson (Sr. Economist)

Gerri Garwood

Eben Thoma

Karen Marsh

Amy Hambrick

Matt Witosky

Lisa Thompson (coordinated the meeting)

On the phone from the Office of Atmospheric Programs:

Melissa Weitz

Mark Defigurido

Adam Eisele

Justin Pryor

Industry Meetings

- IPAA
- IPAA Cooperating Associations
- Liaison Committee
- US Oil and Gas Association
- RPSEA members
- PBPA

EPA's reaction to the presentation

Some reminded me of my dog
Colonel on a bad day



Others supported the study and
relished the data



Observations

- Ambiguity from (smaller) operators as to what does or does not apply to NSPS for 0000 and 0000a particularly related to marginal wells*
- A lot of bad data and assumptions in most of the reports used by EPA
- The rulemaking process gets in the way of reality
- EPA is completely clueless on operations, maintenance, practices
- Economics and justifications, burden assumptions and tradeoff in rule were way off – possibly from ignorance and lack of education of E&P business.
- States balance risks – but they are an ally to operators; realize they have a lot to lose
- RPSEA could help provide sound science objectivity to the process

*adding subpart 0000a, which will apply to facilities constructed, modified or reconstructed after September 18, 2015, to include current VOC requirements already provided in subpart 0000 (as updated) as well as new provisions for GHGs and VOCs across the oil and natural gas source category as highlighted below in this section.

Results of the EPA Meeting

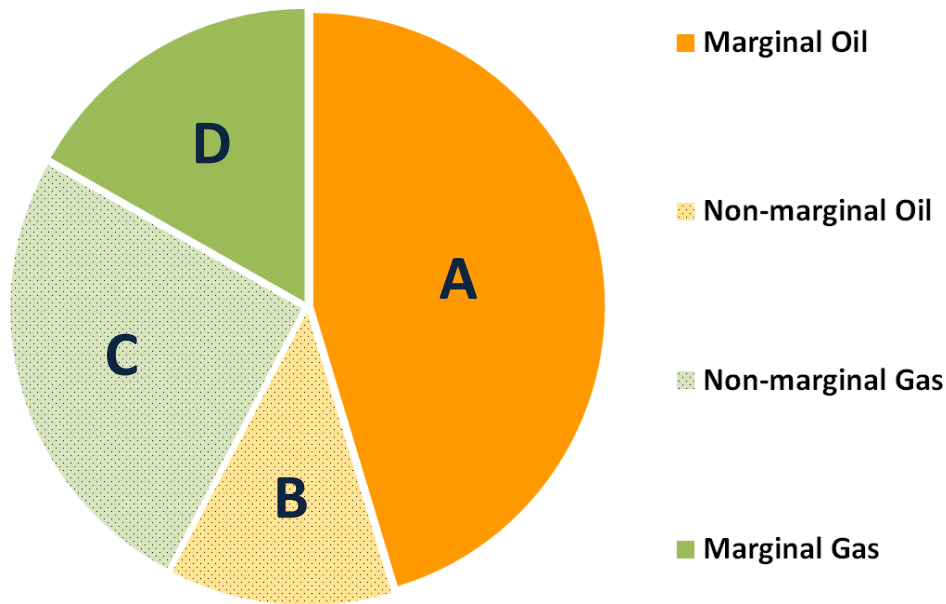
- Proposal Modified (following slide)
- Best with 3 regions (i.e. Permian, one with large % of Marginal wells, one where other methane studies were used in the rules)
- Phased Approach: we have reviewed a lot of reports and data used in the rulemaking
- Access Critical
- Planning Committee needed
- We do not have a budget but have a level of effort and scope EPA will accept

Phase 1 – Desktop study (could be 6 weeks)

- a) Literature Survey:** Identify (with appropriate justification) usable/representative vs. usable/unrepresentative data which may support data mining efforts. Characterize key emission sources, activity data, and associated site metrics on a region-by-region basis.
- b) Operator Survey:** Blind survey of oil and gas producing companies, available data on key site metrics - populations of well sites, number and types of wells; oil, gas, and condensate production rates; and presence (quantity) or absence of various ancillary equipment.
- c) Data Mining:** Database - Categorize well sites as marginal vs. non-marginal and by region and other relevant distinguishing criteria. For key categories, evaluate and compare the frequency of identified emissions sources and summary statistics of related activity data.
- d) Data Gap Assessment:** Identify gaps in the current understanding of emissions from marginal vs. non-marginal well sites – to plan subsequent field investigations, to address key data gaps.
- e) Desktop Study Report:** Characterize key emission sources, activity data, and associated site metrics on a region-by-region basis; will develop proposed field investigation.
- f) Incorporated EPA recommended testing:** process of larger area study with QC on some wells using mutually accepted equipment

DATA MINING / ANALYSIS

EXAMPLE: Texas Production Wells (2015)



- Data from...
 - Literature and operator surveys
 - New field studies

- Fraction of total emissions from marginal well sites?

$$\text{Oil: } \frac{A * E_A}{A * E_A + B * E_B}$$

$$\text{Gas: } \frac{D * E_D}{C * E_C + D * E_D}$$

- Statistical Comparisons:
How different are populations?

Phases 2 Initial and Supplemental Field Investigations

- Identify and visit operators to explain workplan
- Based on Phase 1 – Use established protocols to measure air emissions from both marginal and non-marginal wells and their ancillary components. Emissions estimates will be developed for both. Probably start in the Permian; (this will be repeated at one or two other regions).
- Apply the workplans to collect repeatable, defensible emissions measurements from appropriate, representative populations of marginal and non-marginal oil and gas well sites.
- Apply QA/QC procedures to ensure that all data collected are defensible and comparable. Determine which data should be used for emissions estimation based on the representativeness and accuracy of each set of data points.

FIELD DATA COLLECTION TECHNOLOGIES

Identify and Quantify Fugitive Emissions

Optical Gas Imaging



High Flow Sampler



Photo: Johnson et al., 2015

Measure Upwind/Downwind Plume Concentrations

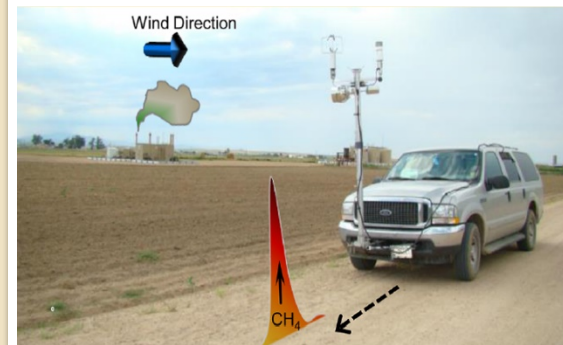


Photo: Brantley et al., 2014

Report

- Summarize and compare emissions among marginal and non-marginal well site populations. Develop reports for each basin and an overall report, including web based story map, GIS map linking all data, emissions estimates and activity factors. Communicate results to industry and discuss with regulators, upon industry approval.
- **Technical Advisory Groups:** Technical advisors from industry, regulatory agencies, academia, NGO's, governmental representatives and other stakeholders (TBD) will be engaged during the project to provide feedback on project activities and review results.

Did they are did they not receive data?

... well sites with production greater than 15 boe per day. Because we did not receive additional data .. This would indicate that the emissions from low production well sites could be similar to that of non-low production well sites... is typically unmanned and not visited as often as other well sites that would allow fugitive emissions to go undetected. We did not receive data showing that low production well sites have lower GHG (principally as methane) or VOC emissions other than non-low production well sites. In fact, the data that were provided indicated that the potential emissions from these well sites could be as significant as the emissions from non-low production well sites because the type of equipment and the well pressures are more than likely the same

Therefore, we believe that the fugitive emissions from low production and non-low production well sites are comparable. Based on these considerations and, in particular, the large number of low production wells and the similarities between well sites with production greater than 15 boe per day and low production well sites in terms of the components that could leak and the associated emissions, we are not exempting low production well sites from the fugitive emissions monitoring program. Therefore, the collection of fugitive emissions components at all new, modified or reconstructed well sites is an affected facility and must meet the requirements of the fugitive emissions monitoring program.