

HIGH-VOLUME HYDRAULIC FRACTURING AND MANAGING ENVIRONMENTAL IMPACT IN NY

Presented at:
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Building a Sustainable Future
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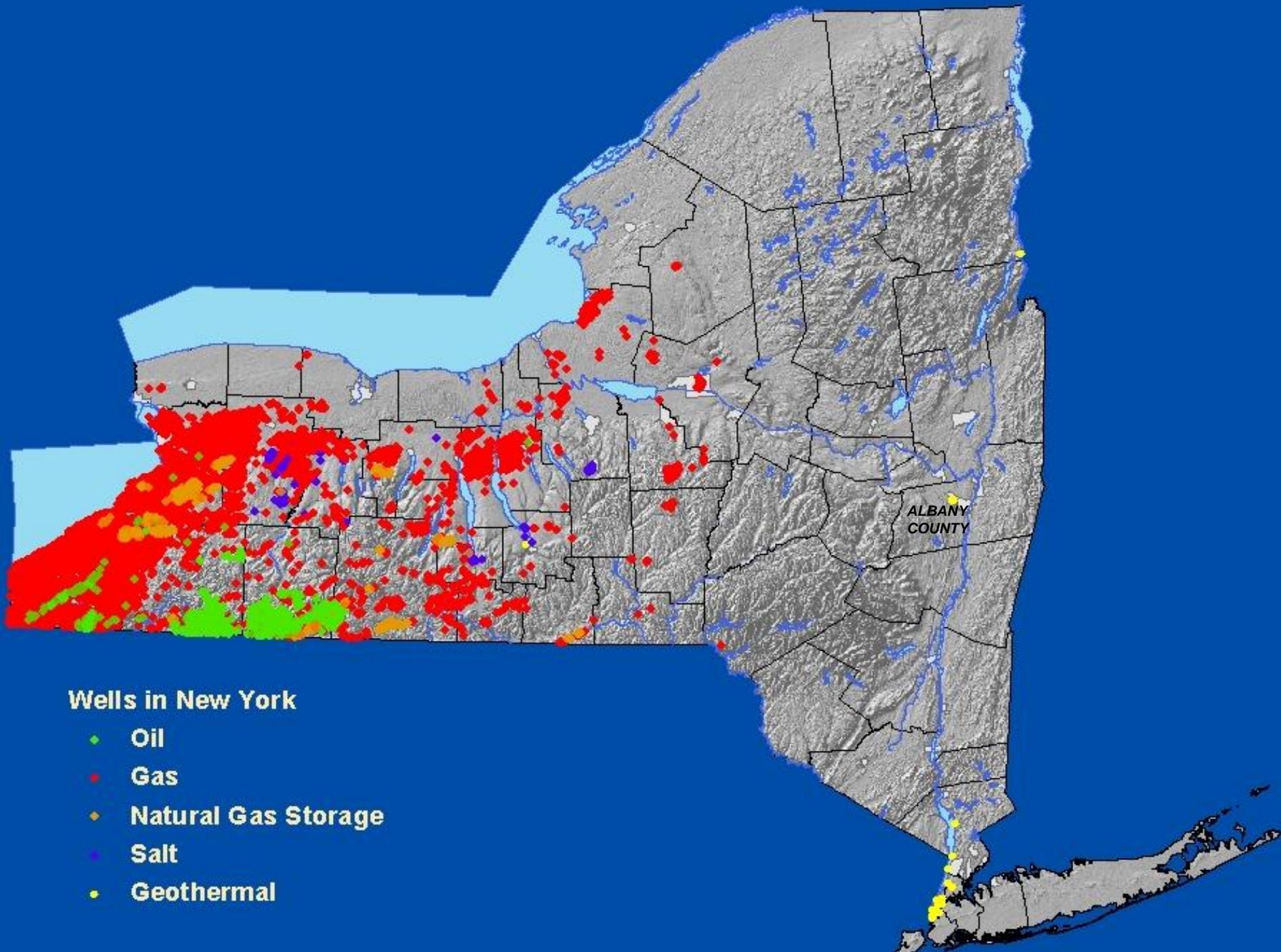
Bradley Field
NYSDEC Division of Mineral Resources



Today's Presentation

- ⦿ Status of hydraulic fracturing in New York
- ⦿ Potential impacts & mitigation
- ⦿ Planning for permits





Wells in New York

- Oil
- Gas
- Natural Gas Storage
- Salt
- Geothermal

Status of Horizontal Drilling and Hydraulic Fracturing in New York

	Water use	Permitting status
Horizontal drilling, no HVHF	GEIS-consistent	<ul style="list-style-type: none"> • Permitted under existing GEIS • First horizontal well drilled in 1989 • Horizontal/directional wells average 10% of permits per year • No “moratorium”
Conventional frac (90% of wells in NY; 552 permits issued in 2009)	Up to 80,000 gallons/well	<ul style="list-style-type: none"> • Permitted under existing GEIS finding of no significant impact • Disclosure to DEC of water source/disposal and frac chemicals required with application to drill • <i>Includes Gastem’s previous and planned Otsego County fracs</i>
High-volume frac (HVHF)	<p>Currently defined as > 80,000 gallons/well</p> <p>Activity described in dSGEIS: 2 – 8 million gallons</p>	<ul style="list-style-type: none"> • 58 applications pending completion of SGEIS





State Environmental Quality Review Act (SEQRA)

- ⦿ Government agency must review the environmental impact of its actions.
 - Issuance of a permit to drill (and frac) a natural gas well is an action which requires review.
- ⦿ Disclose and address the impacts that can be **reasonably anticipated**.
- ⦿ Avoid or minimize adverse environmental impacts to the maximum extent practicable.
- ⦿ Use a Generic EIS (GEIS) to evaluate common impacts.
 - Gas drilling in New York was reviewed in a 1992 GEIS. *Four volumes, 937 pages.*
 - High-volume hydraulic fracturing to be addressed by a supplement (SGEIS).



SGEIS Process

- July 23, 2008: Governor Paterson calls for SGEIS
 - “Moratorium” - *no “high-volume hydraulic fracturing” until SGEIS is complete unless an operator prepares its own project-specific SEIS*
- October 6, 2008: Draft Scope released for public comment
- December 15, 2008: Comment period closed
 - 188 verbal statements at six scoping meetings statewide
 - 3,770 written comments
- February 6, 2009: Final Scope issued
- September 30, 2009: Draft SGEIS published (800+ pages, 587 refs.)
- December 31, 2009: Comment period closed
 - Four DEC hearings + three additional transcripts submitted
 - > 13,000 written comments, including technical reports
- **Categorize, consolidate and evaluate comments**
 - *Additional research and data-gathering underway*
- Final SGEIS, including responsiveness summary
- SEQRA Findings, at least 10 days after final SGEIS



Impacts and Mitigation

1992 GEIS

Concern or potential impact	Potential impacts described and addressed in 1992 GEIS
Water withdrawals, stream flow	n/a
Spills – frac fluid or flowback	Soils, vegetation, habitats, aquatic species, surface water, ground water and drinking water quality
High-TDS discharges or spills	Drinking water (surface and underground), vegetation, soil, fish and fish larvae
Ground water contamination	Could be caused by fluid spills, pit leaks or inadequate casing/cement
Natural gas in water wells	Could be caused by inadequate casing/cement or excessive annular pressure; natural and other sources also recognized
Chemical disclosure	General descriptions of drilling and stimulation fluids included, potential spill impacts disclosed
Air quality	Short-term and minor, no permitting thresholds reached
“Industrialization” (noise, visual, traffic, community impacts)	Impacts described, temporary and short-term, some recognized as unavoidable; multi-well pads and traffic associated with HVHF not reviewed
<p><i>Also addressed:</i> erosion and sedimentation, agriculture, historic sites, archeological sites, significant habitats, floodplains, freshwater wetlands, state lands, coastal zones, general habitat loss</p>	



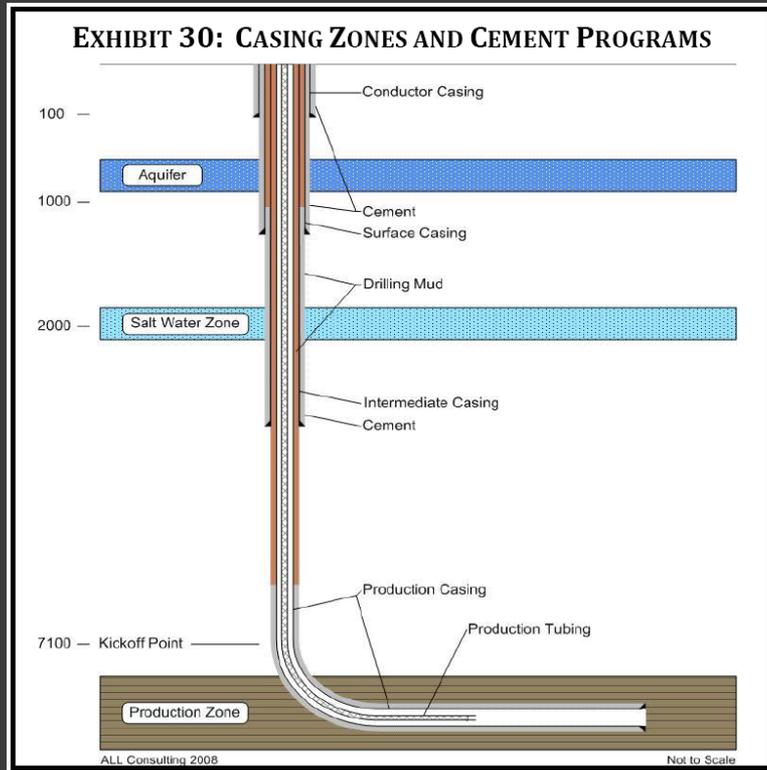
2009 dSGEIS – Proposed Mitigation (1)

Concern or potential impact	2009 dSGEIS
Water withdrawals	Impacts of low-flow described; pass-by flow methodology proposed
Spills	Recognizes enhanced risks relative to high-volume hydraulic fracturing (i.e., larger volume of chemical additives, larger volume of flowback water. Describes NYS spill reporting requirements. <i>Enhanced mitigation:</i> Setbacks, secondary containment, stormwater permit coverage (SWPPP, BMP's), review of site-layout and fluid disposal plan prior to permit issuance
Wastewater disposal	Reiterates existing procedures and requirements for permitted discharges <i>Enhanced mitigation:</i> Review and verification of fluid disposal plan prior to permit issuance; wastewater tracking to be implemented

2009 dSGEIS – Proposed Mitigation (2)

Concern or potential impact	2009 dSGEIS
Ground water contamination, including natural gas in water wells	<i>From surface activities:</i> See spills.
	<i>From reserve pits & centralized flowback impoundments</i> Enhanced mitigation: Construction, liner specifications and fluid removal requirements for reserve pits; double liners/leak detection/site-specific engineering review for centralized flowback impoundments
	<i>From wellbore:</i> Reiterates existing casing and cementing practices, including annular venting Enhanced mitigation: Cement to surface required on production or intermediate casing; cement bond log; pre-frac certification of wellbore construction
	<i>From hydraulic fracturing in target zone:</i> Not a reasonably anticipated impact below 2,000 feet or with 1,000 feet of vertical separation between target zone and deepest fresh water Enhanced mitigation: Site-specific review at shallower depths or with less vertical separation
	Baseline testing and ongoing monitoring of nearby water wells

Casing and Cement - HVHF



Source: DOE 2009 Shale Primer

- Supplementary permit conditions in Appendix 10 of the dSGEIS:
- *If intermediate casing is not installed, then production casing must be fully cemented to surface. If intermediate casing is installed, it must be fully cemented to surface and production casing cement must be tied into the intermediate casing string with at least 300 feet of cement. Any request to waive the preceding requirement must be made in writing with supporting documentation and is subject to the Department's approval. **The Department will only approve a waiver if open-hole wireline logs and all other information collected during drilling from the same well pad verify that migration of oil, gas or other fluids from one pool or stratum to another will otherwise be prevented. In any event, the top of cement on the production casing must be at least 500 feet above the casing shoe or tied into the previous casing string with at least 300 feet of cement.***



2009 dSGEIS – Proposed Mitigation (3)

Concern or potential impact	2009 dSGEIS
<p>Chemical disclosure</p>	<p>dSGEIS lists 197 proposed additives for HVHF</p> <ul style="list-style-type: none"> • 6 service companies, 12 chemical suppliers • 152 with complete compositional information • 260 unique chemicals with CAS #'s disclosed in dSGEIS <ul style="list-style-type: none"> • includes amides, amines, petroleum distillates, aromatic hydrocarbons, alcohols, glycol ethers, ethoxylated alcohols, microbiocides, organic acids and related chemicals, polymers, minerals, metals and other inorganics and miscellaneous other chemicals <p>DEC is monitoring developments in other states and at the federal level</p>
<p>Air quality</p>	<p><i>Potential well pad impacts:</i> PM, NO₂, H₂S, benzene <i>Potential off-site compressor impacts:</i> Benzene, NO₂, formaldehyde <i>Mitigation:</i> control technologies (fuel, equipment), stack heights, public access restrictions</p> <p><i>Centralized flowback impoundments:</i> Potential HAP emissions <i>Mitigation options:</i> Eliminate specific compounds (methanol, heavy naptha, benzene), limit duration and use, cover or use tanks instead, physical barriers to public access</p> <p>Will be subject to site-specific review including frac & flowback composition</p>
<p>“Industrialization” (noise, visual, traffic, community impacts)</p>	<p>Includes descriptions of well pad & equipment size, longer duration of impacts at multi-well pads; truck traffic associated with HVHF <i>Mitigation:</i> Visual impacts mitigation plan, noise impacts mitigation plan, road use agreement or trucking plan, review of local planning documents, careful access road siting</p> <p>DEC is reviewing many comments on this topic</p>

Planning for Permits

- ⦿ The GEIS and SGEIS support the well permit application
- ⦿ Casing and cementing plan must be submitted with application
 - will be individually reviewed
 - must meet or exceed standards set in GEIS and SGEIS
- ⦿ Know the well spacing rules (ECL 23-0501)
- ⦿ Compulsory integration will be required in the absence of 100% unit control



Shale Spacing – 3 Options

Single vertical well *

40 acres

(Not to Scale)

Multiple horizontal wells

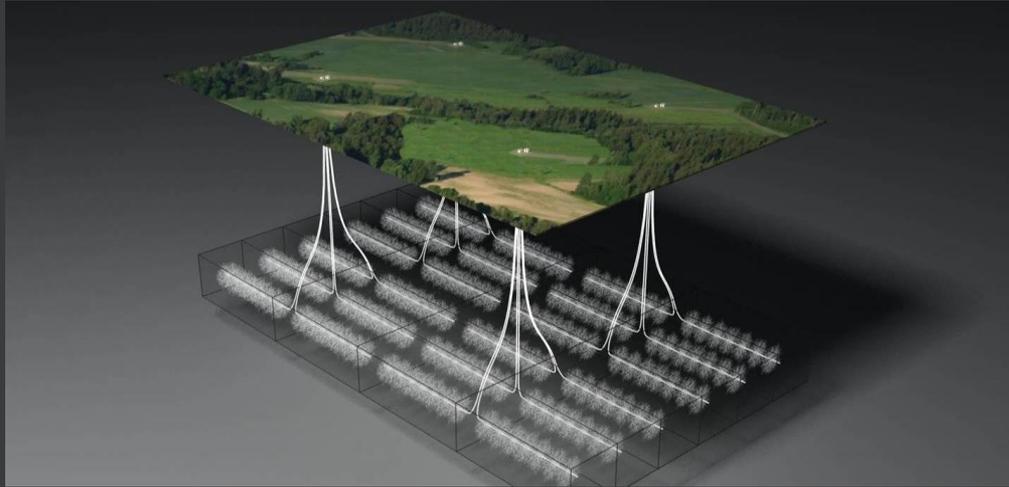
- Up to 640 acres
- Initial lateral wellbores centered in spacing unit
- 330-foot setback from unit boundary
- Written commitment to infill within 3 years

Single horizontal well *

40 acres + acreage to meet 330-foot setback along lateral



Surface disturbance comparison



Source: Chesapeake Energy

10 Square Miles Fully Developed (from dSGEIS, p. 6-144)		
Spacing Option	Multi-Well 640 Acre	Single Vertical Well 40 Acre
Number of Pads	10	160
Total Disturbance - Drilling Phase	50 Acres (5 ac. per pad)	480 Acres (3 ac. per pad)
% Disturbance - Drilling Phase	.78	7.5
Total Disturbance - Production Phase	30 Acres (3 ac. per pad)	240 Acres (1.5 ac. per pad)
% Disturbance - Production Phase	.46	3.75



Preparing for Environmental Review

- ◎ Environmental Assessment Form
 - Water source information
 - River Basin Commission approval needed?
 - Location and resource information environmental setting of well pad
 - Operational information
 - fluid handling
 - emissions sources and control measures
 - Fluid disposal plan



Preparing for Environmental Compliance

- ◎ Permit Conditions
 - Must accept and comply to be covered by SGEIS
 - Includes casing and cementing plan
- ◎ Stormwater permit coverage
- ◎ Planning
 - Consult local planning/policy documents
 - Road use agreements
- ◎ Mitigation plans
 - Visual impacts
 - Noise impacts
 - Greenhouse gas
 - Invasive species



dSGEIS Site/Project-Specific SEQRA Determinations

- ◎ Shallow HVHF
 - < 2,000 below ground
 - less than 1,000 feet vertically from known fresh water supply
- ◎ HVHF within threshold distances from water resources
- ◎ Centralized impoundments for flowback water
- ◎ Some water withdrawals



For more information:

- ◎ <http://www.dec.ny.gov/energy/46288.html> -
DEC's Marcellus Shale page
- ◎ <http://www.dec.ny.gov/energy/58440.html> -
dSGEIS page
- ◎ <http://www.dec.ny.gov/energy/45912.html> -
Original GEIS



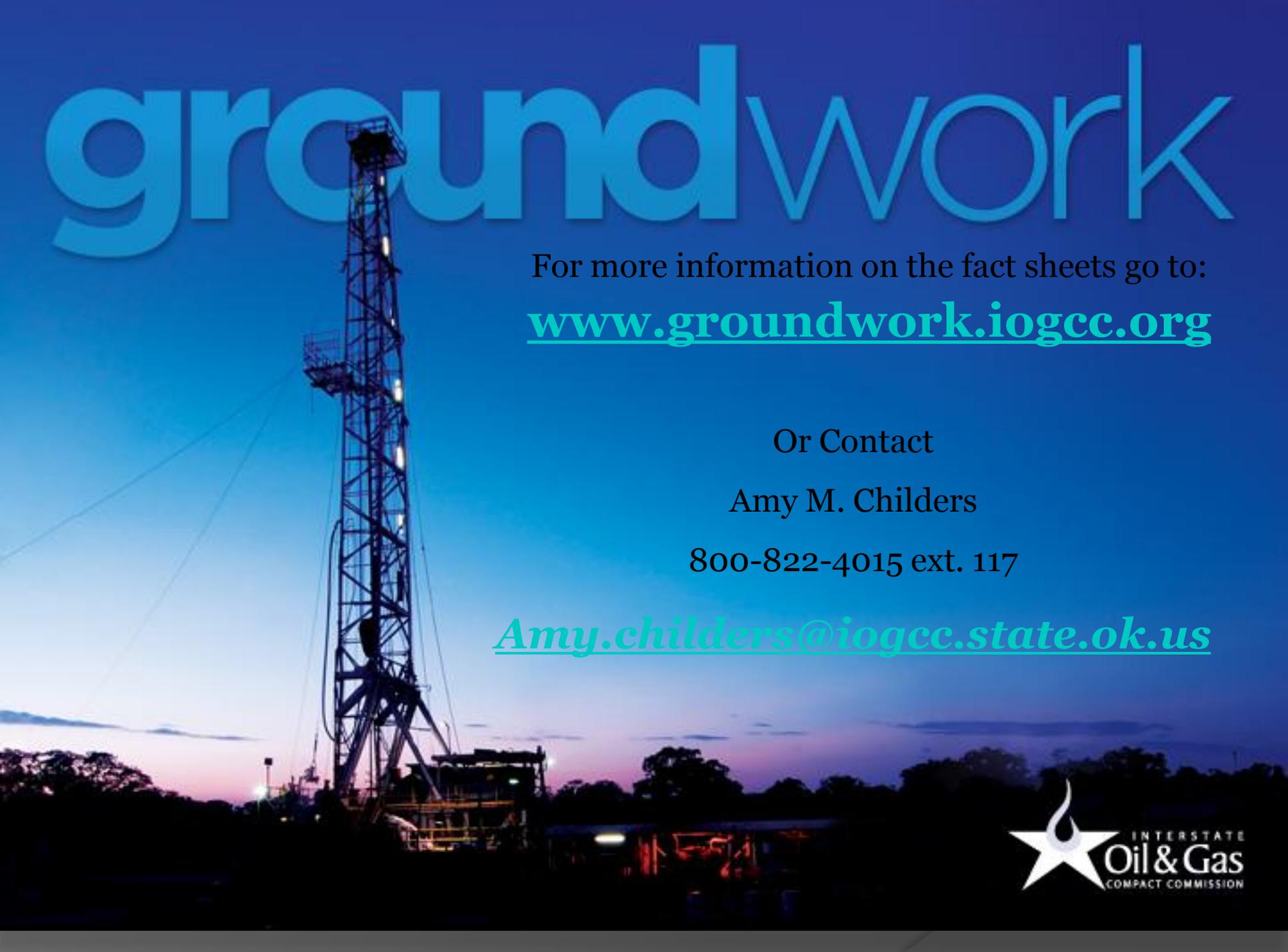
IOGCC's Groundwork



- Multi-tiered
- Web-centric
- Instant access to state regulatory information
- Fact Sheets



groundwork



For more information on the fact sheets go to:

www.groundwork.iogcc.org

Or Contact

Amy M. Childers

800-822-4015 ext. 117

Amy.childers@iogcc.state.ok.us

