

SOCIAL LICENSE TO OPERATE:

Standards, Validation, Collaboration

National Research Council:
Shale Gas Risk Governance

Andrew G. Place
Interim Executive Director
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ENGAGEMENT

Founding Members

- Chevron
- Clean Air Task Force
- CONSOL Energy
- Environmental Defense Fund
- EQT Corporation
- Group Against Smog and Pollution (GASP)
- Heinz Endowments
- Citizens for Pennsylvania's Future (PennFuture)
- Pennsylvania Environmental Council
- Shell
- William Penn Foundation

Board of Directors

- **Armond Cohen**, Executive Director, Clean Air Task Force
- **Jared Cohon (Chair)**, President Emeritus of Carnegie Mellon University
- **Nicholas Deluliis**, President of CONSOL Energy
- **Paul Goodfellow**, Vice President, U.S. Unconventionals, Shell
- **Paul King**, President, Pennsylvania Environmental Council
- **Fred Krupp**, President, Environmental Defense Fund
- **Jane Long**, Principal Associate Director/Fellow, Lawrence Livermore National Laboratory (retired)
- **Nigel Hearne**, President, Chevron Appalachia
- **Paul O'Neill**, former Secretary of the U.S. Treasury Department and former CEO of Alcoa
- **David Porges**, President and CEO of EQT Corporation
- **Robert Vagt**, President, The Heinz Endowments
- **Christine Todd Whitman**, former Administrator of the U.S. Environmental Protection Agency and former Governor of New Jersey

CORRELATIVE WORK

U.S. Secretary of Energy's Advisory Board, Shale Gas Production Subcommittee

- ...for industry to increase their best practices process for field engineering and environmental control activities by adopting the objective of continuous improvement, validated by measurement and disclosure of key operating metrics
- Best practices involves the entire range of shale gas operations
- ...understand the importance of involving non-industry stakeholders

Source: SEAB Shale Gas Production Subcommittee – Final Report (November 2011)

National Petroleum Council

- ...“prudent development of North American natural gas and oil resources” means development, operations, and delivery systems that achieve a broadly acceptable balance of several factors: economic growth, environmental stewardship and sustainability...
- ...the NPC recommends the establishment of industry-led, regionally based, “councils of excellence” for identification and dissemination of effective environment, health, and safety practices for natural gas and oil production and delivery. The intention is to involve industry, government, academics, nongovernmental organizations (NGOs), and other stakeholders...
- ...include operational risk management approaches, better environmental management techniques, and methods for measuring environmental performance.

Source: National Petroleum Council, *Prudent Development* (September 2011)

IEA: Golden Rules for a Golden Age of Gas

- Measure, disclose and engage
- Watch where you drill
- Isolate wells and prevent leaks
- Treat water responsibly
- Eliminate venting, minimize flaring and other emissions
- Be ready to think big
- Ensure a consistently high level of environmental performance

Source: Golden Rules for a Golden Age of Gas (IEA, 2012)

CONTEXT

- **Working group (2011)**
 - Defined scope
 - Conceptually aligned
 - Constrained group size
- **Standards & Certification**
 - Derivative from existing body of work
 - Third-party, independent certification
 - Basin specific
- **Regionally Bound Standards – process model**
 - Balance
 - Collaboration
 - Verifiability

STANDARDS & EVALUATION

Groundwater Protection Standards

- Zero discharge of wastewater until adoption of a treatment standard.
- Wastewater recycling – > 90%.
- Closed loop containment of drilling fluids.
- Double-lined impoundments with leak detection.
- Pad specific Area of Review and risk analysis.
- Groundwater monitoring– pre and post operation.
- Casing and cement standards.
- Disclosure of well stimulation fluids.
- Well pad design –minimizing risk to water sources.
- Spill response and public notification plans.

Regional Air and GHG Standards

- Removal of hydrocarbons from flowback and produced water before storage.
- Reduced Emissions Completions – with exceptions.
- Flaring requirements – 98% destruction efficiency.
- Emissions standards for:
 - diesel drilling rig engines
 - frac pump engines
 - compressor engines
 - on-road truck engines
- Condensate tank emissions control.
- Reciprocating compressor and pneumatic controller emissions reductions.

CONTACTS

625 Liberty Avenue, Suite 395
Pittsburgh, PA 15222

412.804.4170

www.sustainableshale.org

andrew.place@sustainableshale.org