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Marcellus Shale Gas Academic Research

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Marcellus Shale Academic Research Conference
May 31, 2012

U.S. Department of the Interior
U.S. Geological Survey

Presidential Executive Order

- Signed in April to coordinate Federal activities to support safe and responsible development of domestic natural gas resources
- High-level interagency working group to promote close interagency coordination
- Coordinate sharing of scientific and environmental information
- Coordinate plans for long-term research, resource assessment, and infrastructure development

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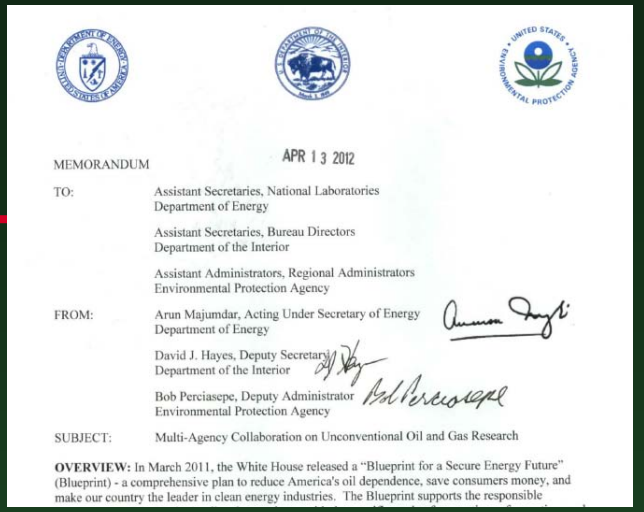
Interagency Memorandum of Agreement



MEMORANDUM

APR 13 2012

TO: Assistant Secretaries, National Laboratories
Department of Energy

Assistant Secretaries, Bureau Directors
Department of the Interior

Assistant Administrators, Regional Administrators
Environmental Protection Agency

FROM: Arun Majumdar, Acting Under Secretary of Energy
Department of Energy

David J. Hayes, Deputy Secretary
Department of the Interior

Bob Perciasepe, Deputy Administrator
Environmental Protection Agency

SUBJECT: Multi-Agency Collaboration on Unconventional Oil and Gas Research

OVERVIEW: In March 2011, the White House released a "Blueprint for a Secure Energy Future" (Blueprint) - a comprehensive plan to reduce America's oil dependence, save consumers money, and make our country the leader in clean energy industries. The Blueprint supports the responsible

- Also signed in April
- Promote multi-agency collaboration on unconventional oil and gas production among Department of the Interior, Department of Energy, US Environmental Protection Agency
- Each agency focuses on core capabilities
- Steering Committee
- Formal research plan and annual report

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Marcellus Shale Gas Opportunities for Collaboration

- Collaboration opportunities with and among Federal and State agencies, Susquehanna River Basin Commission, Delaware River Basin Commission, academia, NGOs
- Susquehanna River Basin Commission Remote Water Quality Monitoring Network – 51 stations
- Coordination with Chesapeake Bay Program and Landscape Conservation Cooperatives
- Integrated Federal/State collaborative comprehensive scientific study of the effects of Marcellus Shale gas production on the environment – not NEPA

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Marcellus Shale Comprehensive Plan Key Thematic Science Issues

- Hydrogeologic Framework
- Water Availability
- Water Quality
- Induced Seismicity
- Air Quality and Stray-Gas Emissions
- Landscape Changes
- Biota: Terrestrial and Aquatic Wildlife

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What is the most useful role the academic community can and should play in pursuing research on Marcellus Shale?

- Controls of hydrocarbon composition and character
  - Study of sedimentologic and diagenetic processes controlling organic composition, richness, and variability.
  - Isotopic fingerprinting of gas composition to assist in stray gas analyses.

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Marcellus Shale Research – con't

- Structural framework of Marcellus Shale to better understand potential fluid migration pathways
  - Seismic reflection sections and geologic mapping.
  - Hyperspectral imaging to detect potential structures.

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Marcellus Shale Research – con't

- Compile and provide databases of Marcellus Shale gas drilling data, groundwater and surface water quality data, etc.
- Research on improving microseismic theory and applications and magnetic field imaging of extent of hydraulic fractures.

Photo Courtesy of Damian M. Zampogna,
The Susquehanna River Basin Commission

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Marcellus Shale Research – con't

- Conduct research on rock-water interactions between formation water and injected hydrofracturing fluids; including non-aqueous fluids such as hydrocarbons and gases.
- Conduct research on the effect of hydraulic fracturing chemicals on human health

Marcellus Shale Research – con't

- Conduct studies to assess the impact of land clearance and forest fragmentation on key wildlife and aquatic species.
- Assess the impact of infrastructure development on habitats and species.
- Assess the impact of Marcellus Shale gas development activities on ecosystem services.

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Socioeconomic Analyses

- Multidisciplinary Resource Assessment
  - Comparing market resources and non-market resources
  - Determining “net” value of varying resources and evaluating ecological trade-offs in an ecosystem services framework
  - Integrating assessments and identifying landscape scale cumulative impacts to develop improved approaches to managing resources
  - Support to USFWS and State decision-makers

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Multi-Disciplinary Research

- Work with Federal agencies on new hydraulic fracturing program; also with States and river basin commissions.
  - New technologies with DOE including green frac fluids, new treatment techniques for flowback and produced waters.
  - Explore linkage of monitoring networks, e.g. USGS streamflow and CUAHSI
  - Collaborative science with EPA, DOE, and USGS at research well sites e.g. EPA Prospective Sites