

Technical Follow-up Discussion on Subsurface Modeling Participants

Anthony Badalamenti, Chief Global Technical Advisor, Cementing Product Service Line, Halliburton Energy Services, Inc.

Anthony Badalamenti is Chief Global Technical Advisor for Halliburton Cementing. In this capacity, Badalamenti is helping customers establish zonal isolation in oil or gas wells by overcoming issues such as excessive pressures, extremely high temperatures and expansive water depths offshore. Prior to this, Badalamenti lead the research and development initiatives of Halliburton's Cementing Product Service Line and served on the company's Information Technology advisory board. Among many other innovations, under his leadership the industry has benefitted from the development of new chemistries that enhance slurry properties such as free water control, compressive strength development and rheology, as well as the development of mechanical devices that enhance zonal isolation for greater wellbore integrity. Badalamenti can also be credited with the vision for and development of a predictive analysis tool built on finite element analysis and computational fluid dynamics. Badalamenti holds a BS in Civil Engineering from Tulane University and a BA in History from Nicholls State University.

Karl Bandilla, Associate Professional Specialist, Civil and Environmental Engineering Department, Princeton University

Karl Bandilla is an Associate Professional Specialist in porous medium flow at Princeton University. He is a hydrogeologist with expertise in single- and multi-phase subsurface flow modeling, with over eight years of research experience. He has worked on projects related to contaminant transport and geologic carbon sequestration. He is currently an Associate Professional Specialist in the Civil and Environmental Engineering Department at Princeton University, where he conducts research on multi-phase flow in the subsurface. In the area of hydraulic fracturing, he is especially interested in the leakage of fracturing fluid and methane to overlying sources of drinking water. He has a Dipl-Ing in Civil Engineering (Technical University of Darmstadt), a MS in Civil and Environmental Engineering (SUNY at Buffalo) and a PhD in Civil and Environmental Engineering (SUNY at Buffalo).

Timothy Beard, Manager of Operations, Engineering Technology Group, Chesapeake Energy Corporation

Timothy Beard is the Manager of Operations within the Engineering Technology Group for Chesapeake Energy Corporation, working out of the company headquarters in Oklahoma City, OK. At Chesapeake, he currently manages discipline experts in completions (hydraulic fracturing), drilling, artificial lift, chemicals, water reclamation and environmental engineering. Beard was previously the Senior Engineering Advisor - Completions within the Engineering Technology Group at Chesapeake. Beard presented in the first set of US EPA technical workshops on hydraulic fracturing in the well construction and operations section in May of 2011. The title of the presentation/abstract was "Fracture Design in Horizontal Shale Wells - Data Gathering to Implementation." Beard has been very involved with the modeling and

design of hydraulic fractures in horizontal wells since the early days of horizontal wells in the Barnett Shale. He has modeled and supervised the pumping of hydraulic fractures in the majority of the large shale plays across the continental United States. Prior to joining Chesapeake in 2006, he was a Completions Engineer for ConocoPhillips, working out of the companies Midland, TX, office. He earned a BS in Mechanical Engineering from Texas Tech University.

John Bolakas, Senior Principal Hydrogeologist, Stantec Consulting Services, Inc.

John Bolakas, a Senior Principal at Stantec Consulting Services, Inc., has more than 27 years of experience directing and managing the delivery of environmental services to the oil and gas industry. In his position as Sub-Sector Lead, Upstream Oil and Gas, he is responsible for developing strategy and providing technical direction on environmental investigation and response projects related to oil and gas exploration, production and completion. Bolakas is the Senior Principal and Project Director on client confidential projects related to investigating the potential release of hydraulic fracturing and well completion fluids to surface and subsurface media. He has worked closely with experts in industry, chemical analytics, toxicology and data validation to develop methodologies, interpret data and provide technical recommendations for these investigations and response actions. Bolakas, as Senior Principal Hydrogeologist, provides technical expertise on groundwater and surface investigation and response cases related to stray gas, gas migration and shallow groundwater disturbance. He was previously selected to participate in US EPA's 2011 Technical Workshop on Well Construction and Operations for the Hydraulic Fracturing Study. Bolakas is Professional Geologist in DE, FL, PA, TX and WY and is a Licensed Site Remediation Professional in NJ. He has his BA from Franklin and Marshall College, where he majored in Geology, and his MS in Geology from University of Delaware.

Richard Boone, Technical Associate, O'Brien & Gere

Richard Boone is a Technical Associate with O'Brien & Gere. He is an experienced Project Manager and Hydrogeologist with more than 26 years of diversified consulting, regulatory and research experience involving industrial/hazardous waste management, environmental due diligence and groundwater resource investigations. Boone has project management and technical experience on environmental investigation and remediation projects involving commercial properties, closed or abandoned landfills, petroleum refineries, chemical manufacturing facilities and other industrial companies. He has performed groundwater flow and transport modeling in a variety of hydrogeologic settings involving industrial, chemical, petroleum, power and water supply facilities. His experience includes area-of-review evaluations to assess adequate confining zones; the application of borehole geophysical logging, drill-stem testing and injection tests and hydraulic analysis to establish permit injection pressures. He is a Professional Geologist and has a BA in Geology from Miami University (Ohio) and a MS in Hydrology/Hydrogeology from the Mackay School of Mines, University of Nevada-Reno, awarded while a Research Fellow at the Desert Research Institute in Reno, NV.

Michael Celia, Professor, Department of Civil and Environmental Engineering, Princeton University

Michael Celia is a professor in the Department of Civil and Environmental Engineering at Princeton University. He is also the Theodora Shelton Pitney Professor of Environmental Studies, and served as Department Chair in the CEE Department from 2005 to 2011. In 1985 he joined the faculty of MIT, and returned to Princeton to join the Civil Engineering faculty in 1989. Celia's areas of research include ground-water hydrology, multi-phase flow in porous media, numerical modeling and new subsurface technologies for climate-change mitigation and sustainability. Ongoing projects include development of new simulation tools to model CO₂ injection, migration and possible leakage associated with carbon capture and storage technologies and studies of multi-phase flow and transport in porous media with a focus on multi-scale models, hysteresis and phase trapping. The carbon work is part of a large multi-disciplinary effort at Princeton known as the Carbon Mitigation Initiative. As a contributing author for the IPCC Working Group III Special Report on Carbon Dioxide Capture and Storage, Celia shares, with many colleagues, the 2007 Nobel Peace Prize. Celia received a BS in Civil Engineering from Lafayette College in 1978, a MS in Civil Engineering from Princeton University in 1979 and a PhD from Princeton in 1983.

Tim Ellison, Senior Research Associate, ExxonMobil Upstream Research Company

Tim Ellison is the Well Injection Design/Operations Advisor at ExxonMobil's Upstream Research Company. He began his career in 1985 at Mobil's Dallas Research Laboratory and has spent most of his career in research, with a wide variety in experience including Enhanced Oil Recovery, Reservoir Engineering, Well Construction and Completions and Unconventional resource development. Since 2010, he has served as the Senior Technical Professional Advisor in the ExxonMobil upstream, where he supports ExxonMobil's worldwide operations in the area of injection well design and operations, and advises on the direction of injection research. He led the well injection team from its inception in 2005 through 2011 to progress injection technology, and applied that technology to projects across the upstream. A key element that the team addressed was the prediction of the extent of fractures that are formed during long-term injection processes, often providing fracture containment predictions that were used in the regulatory process to permit injection wells. He currently is an advisor for the Unconventional Gas and Tight Oil Recovery Project that develops technology for application to unconventional resource within ExxonMobil. In several previous assignments he worked on projects with significant geomechanics elements, including California diatomite (1993-1997, hydraulic and steam-induced fracturing), Venezuelan Cerro Negro heavy oil development (1997-2000, compaction) and Canadian Cold Lake development (2000-2003, steam-induced fracturing). He holds a BS in Chemical Engineering from the University of Missouri-Rolla and a MS and PhD in Chemical Engineering from the University of Illinois at Urbana-Champaign.

Stuart Ellsworth, Engineering Manager, Colorado Oil and Gas Conservation Commission

Stuart Ellsworth is the Engineering Manager for the Colorado Oil and Gas Conservation Commission (COGCC). His responsibilities include managing a 9 member staff, who review drilling permits, completion reports, workover plans, cement bonding, casing repairs, plugging and abandonment procedures for COGCC regulation approval. Implimentated programs have been the Wattenberg Bradenhead Testing Program, East Mamm Creek Study and the Adena Field Inactive Well Monitor Program. Prior to working for the COGCC he worked for engineering and oil and gas companies throughout the Rocky Mountains, Mid-Continent, Saudi Arabia and Algeria. He is a Colorado Professional Engineer and a Licensed Geologist with BS in Geology from Western Michigan University and Civil Engineering from the University of Colorado.

Marc Glass, Principal, Downstream Strategies, LLC

Marc Glass has over thirteen years of experience in environmental consulting and management, including nine years as a West Virginia Department of Environmental Protection Licensed Remediation Specialist. He is skilled in the evaluation and remediation of environmental contamination. Glass' experience includes Phase I and Phase II environmental site assessments, petroleum and chlorinated solvent site investigations, design and installation of monitoring well networks, aquifer testing, asbestos and biological remediation and project supervision, preparation of facility Spill Prevention Plans for above ground and underground storage tank facilities and mold investigation and remediation. Glass' experience includes management of remediation projects in the West Virginia Voluntary Remediation and Redevelopment Program and Pennsylvania Department of Environmental Protection Land Recycling Program.

Susan Harvey, Owner, Harvey Consulting, LLC

Susan Harvey has over 25 years of experience as a Petroleum and Environmental Engineer, working on oil and gas exploration and development projects. Harvey is the owner of Harvey Consulting, LLC, a consulting firm providing oil and gas, environmental, regulatory compliance advice and training to clients. Harvey held engineering and supervisory positions at both Arco and BP including Prudhoe Bay Engineering Manager and Exploration Manager. Harvey has planned, engineered, executed and managed both on and offshore exploration and production operations, and has been involved in the drilling, completion, stimulation, testing and oversight of hundreds of wells in her career. Harvey's experience also includes air and water pollution abatement design and execution, best management practices, environmental assessment of oil and gas project impacts and oil spill prevention and response planning. Harvey has worked on oil and gas projects in Alaska, New York, Pennsylvania, Ohio, West Virginia, Texas, New Mexico and Oklahoma, as well as in Canada, Australia, Russia, Greenland and Norway. Harvey holds a MS in Environmental Engineering from the University of Alaska Anchorage and a BS in Petroleum Engineering from the University of Alaska Fairbanks.

Hugh MacMillan, Senior Researcher, Food & Water Watch

Hugh MacMillan is a senior researcher at Food & Water Watch, where his work focuses on environmental and public health impacts of unconventional oil and gas development. Prior to joining Food & Water Watch, he served one year as a science advisor in the US Senate and five years as an Assistant Professor of Mathematical Sciences at Clemson University. He is a computational scientist with deep knowledge of numerical methods for developing multiscale models of reaction-diffusion-advection systems. He has experience working on diverse computational problems, including multiphase fluid flow through porous and fractured media, crack formation and propagation and chemical and microbiological processes. Further, he is experienced in mathematical and statistical methods for quantifying the uncertainties inherent to such modeling, toward model validation and verification.

Bryce McKee, Senior Staff Geologist, Shell Exploration & Production Company

Bryce McKee is the senior staff geologist at Shell Exploration & Production Company's Pittsburgh, Pennsylvania office. He is responsible for oversight and technical assurance of well planning and operations within Shell Appalachia's development team. Prior to working in the Pittsburgh office, McKee was the Lead Reservoir Modeler for Shell's deepwater Perdido Development Project (Alaminos Canyon Block 857) responsible for building geologically realistic and detailed geocellular reservoir models of the structurally complex WM12, FR22 and FR24/26 reservoirs in the Great White Field based on high-resolution 3D seismic, petrophysical data and well cores. These models were used as the basis for booking SEC-compliant reserve volumes and for numerical simulation of multi-phase hydrocarbon flow for field development and well planning. McKee is recognized as a focal point/subject matter expert/technical resource within the production geology community at Shell. McKee is also the subsurface technical focal point for Shell's multidisciplinary groundwater protection and stray gas mitigation team. McKee has 26 years of oil industry experience, having worked on both exploration and production projects in the North Sea, Middle East, Poland, Trinidad, Argentina, offshore Brazil, offshore Australia, offshore West Africa, East Texas, South Texas, the Permian Basin and the Gulf of Mexico. He earned a BS in 1984 and a MS in 1986, both in Geology, from Baylor University in Waco, Texas. McKee is a member of the American Association of Petroleum Geologists, the Pittsburgh Society of Petroleum Geologists, the Society of Exploration Geophysicists, the Pittsburgh Geological Society and the Houston Geological Society. Licensed Professional Geologist in the State of Pennsylvania (Lic. No. PG005046) and Texas (Lic. No. 11365).

George Moridis, Staff Scientist, Earth Sciences Division, Lawrence Berkeley National Laboratory

George Moridis has been a Staff Scientist in the Earth Sciences Division of Lawrence Berkeley National Laboratory (LBNL) since 1991, where he is the Deputy Program Lead for Energy Resources, leads the development of the new generation of LBNL simulation codes and is in charge of the LBNL research programs on hydrates and tight/shale gas and on the analysis of the environmental impact of hydraulic fracturing. Moridis is a visiting professor in the Petroleum Engineering Department at Texas A&M University and in the Guangzhou Center for Gas Hydrate Research of the Chinese Academy of Sciences; he is also an adjunct professor in

the Chemical Engineering Department at the Colorado School of Mines and in the Petroleum and Natural Gas Engineering Department of the Middle East Technical University, Ankara, Turkey. Moridis is the author or coauthor of over 65 papers in peer-reviewed journals, more than 175 LBNL reports, paper presentations and book articles and three patents. He was a Society of Petroleum Engineers (SPE) Distinguished Lecturer for 2009-10, and was elected an SPE Distinguished Member in 2010. He is the recipient of a 2011 Secretarial Honor Award of the US Department of Energy. He is an Associate Editor of four scientific journals and a reviewer for 24 scientific publications. He holds MS and PhD degrees from Texas A&M University and BS and ME degrees in Chemical Engineering from the National Technical University of Athens, Greece.

Thomas Myers, Hydrologic Consultant, Great Basin Hydrology

Thomas Myers is an independent hydrologic consultant based in Reno, NV. He is a hydrogeologist with 15 years of experience in contaminant transport and numerical modeling. After earning his PhD, Myers has been consulting and conducting research in various aspects of hydrogeology concerning mining, mine dewatering, energy development including hydraulic fracturing, groundwater monitoring and water rights. He has published three articles on numerical modeling and an article on contaminant pathways as related to hydraulic fracturing - "Potential contaminant pathways from hydraulically fractured shale to aquifers" in the journal Ground Water in 2012. Myers is a member of the National Groundwater Association, International Association of Hydrogeologists, American Water Resources Association and American Geophysical Union. He has a PhD and MS in Hydrology/Hydrogeology from the University of Nevada, Reno.

Kris Nygaard, Senior Stimulation Consultant, ExxonMobil Production Company

Kris Nygaard is the Senior Stimulation Consultant at ExxonMobil Production Company. He is the company's recognized expert on hydraulic fracturing and is responsible for coordinating ExxonMobil's Upstream Fracturing Center of Excellence. During the last 20 years at ExxonMobil, he has held numerous technical and management positions and has extensive background and expertise in unconventional resources, hydraulic fracturing, subsurface engineering and related technologies. In 2009, he became Senior Supervisor of URC's Unconventional Resources - Recovery Section responsible for developing ExxonMobil's next generation completion and reservoir recovery technologies focused on unconventional resources (tight gas, shale gas, tight oil and coal-bed methane) and providing global technical support to business units in the broad area of unconventional resources. In 2010, Nygaard moved to EMPC to form and lead ExxonMobil's Upstream Fracturing Center of Excellence. In his current role, he is relied upon widely across ExxonMobil for his expertise in stimulation technology and applications to new and existing business opportunities. He holds a BS in Mechanical Engineering, a MS in Aerospace Engineering and a PhD in Mechanical Engineering all from the University of Arizona.

Karen Olson, Completion Engineering Chief, Southwestern Energy Company

Karen Olson is the Completion Engineering Chief for Southwestern Energy in Houston, TX. She has been a Completion/Reservoir Engineer for over 29 years with expertise in the design/modeling (both pre and post) and operational execution of hydraulic fracturing. Her expertise of hydraulic fracturing and the desire to really understand what is happening during the fracturing process began while working on her Master's Thesis, "Evaluation of Massive Hydraulic Fracturing Experiments In the Devonian Shale in Lincoln County, West Virginia" (Topical Report - GRI May 1987). Since that time she has worked conventional and unconventional reservoirs where hydraulic fracturing was required. She has gained an expertise for knowing how to gather the appropriate data required understand/model hydraulic fracturing in the various reservoir types and how to optimize them. She has done this in multiple horizons across the United States, in the North Sea (horizontal wellbores with large hydraulic fractures) and in Deep Water Gulf of Mexico. She is also heading up research with Terra Tek, Colorado School of Mines and Texas A&M to better understand the complexity of discrete fracture networks during hydraulic fracturing and the transport of proppant into these networks. Olson has been a committee member of numerous Society of Petroleum Engineers (SPE) forums, workshops and conference related to hydraulic fracturing. She is the Guest Editor for the Hydraulic Fracturing section of the Journal of Petroleum Technology. She was recently recognized by her industry peers by being selected the 2014 Chairman for the SPE Hydraulic Fracturing Conference. She holds a BS degree in Petroleum Engineering from Louisiana State University (1983) and a MS degree in Petroleum Engineering from Texas A&M (1987).

Rajesh Pawar, Senior Project leader, Los Alamos National Laboratory

Rajesh Pawar is a Senior Project Leader for the fossil energy programs at Los Alamos National Laboratory (LANL). He has been working in the areas of multi-phase fluid flow in porous media including oil and gas flow, geologic storage of carbon dioxide (CO₂) and risk assessment of large-scale geologic CO₂ storage. He has led multiple multi-disciplinary, multi-organizational projects in various research areas mentioned above. Pawar is an expert in the numerical simulation of multi-phase, non-isothermal fluid-flow in porous media. He has developed capabilities in LANL's Finite Element Heat and Mass Transfer code porous media simulator that are being extensively applied to complex problems such as simulation of oil and gas production and subsequent production from oil-shale reservoirs, geologic sequestration of carbon dioxide (CO₂) and production of methane from methane-hydrate reservoirs. Pawar led LANL team that was part of the Flow Rate Technical Group that estimated oil flow rates from British Petroleum's Macondo Well after the Deepwater Horizon accident. He is recipient of the 2011 Secretary of Energy's Honor award for exceptional service and 2010 USGS Director's Award for Exemplary Service to the Nation for his work on the Macondo well. Pawar holds a PhD in Chemical Engineering from the University of Utah.

George Pinder, Professor, University of Vermont

George Pinder is a Professor at the University of Vermont in Burlington, VT. He is a subsurface flow and transport theoretician and modeler with expertise in the fate and transport of natural and anthropogenic contaminants in groundwater, with over 45 years of research and professional experience. He has worked on natural systems as well those that have been impacted by industrial activities. He has evaluated environmental conditions at many such sites in the United States. After completing his PhD, he was a Research Hydrologist in the U.S. Geological Survey's National Research Program, where he conducted research on subsurface flow and transport modeling. He has published over 120 papers and ten books in the area of groundwater flow and transport modeling. He has a BS in Geology from the University of Western Ontario and PhD in Geology with minors in Civil Engineering and Statistics from the University of Illinois.

Robert Podgorney, Senior Scientist, Idaho National Laboratory

Robert Podgorney is a Senior Scientist and Department Manager at the Idaho National Laboratory and an affiliate faculty member with the Center for Advanced Energy Studies, a public-private research partnership between the Idaho National Laboratory and Idaho public research universities. He is currently leading the development of a parallel, fully coupled hydro-thermal-mechanical simulator for modeling discrete hydraulic stimulation (fracturing) within reservoir scale (continuum) models, with targeted applications for simulating enhanced geothermal systems and unconventional gas reservoirs. His research interests in general center on water and energy related issues, focusing on experimental, numerical and analytical investigations of multiphase fluid flow in fractures and fracture networks and the development of massively parallel simulators for describing these systems. The International Partnership for Geothermal Technology has recently recognized his expertise in geothermal simulation, as he has been appointed to serve as the United States Convenor to the Reservoir Modeling Working Group for an indefinite term. His experiences span from field based well drilling and monitoring activities to regional scale groundwater management and modeling, for both environmental and energy applications.

Steven Pohler, Marathon Oil Corporation

Steven Pohler has 32 years of industry experience, 24 years of those with Marathon Oil Corporation, three years with an Independent and five years with ExxonMobil. He has experience in deepwater completions, production operations, well optimization, workover/completions and drilling. He worked on the start up of Marathon Sakhalin Project, working in Equatorial Guinea and Angola for ExxonMobil on deep water completions on floaters and tension leg platforms. He helped in the development of the Marathon Oil Corporation owned Annual Velocity Enhancer Technology, the true bore sliding sleeve and toe sleeve. Also, Pohler was the start up Completions Manager for the Eagle Ford Shale Play that Marathon Oil entered in 2011. Pohler is presently involved with drilling and completion issues that are handled by World Wide Drilling and Completions in areas that Marathon is presently working in. Perform Peer reviews and review procedures on operations handled throughout the world for Marathon Oil. Pohler holds a BS in Petroleum Engineering from Texas Tech University.

Gary Schein, Technical Advisor, Pioneer Natural Resources

Gary Schein provides technical and engineering support throughout the areas in which the Pioneer Natural Resources has operations including, South Texas, Permian, North Texas, Alaska and Midcontinent. In these areas Pioneer is actively drilling unconventional reservoirs such as Barnett Shale, Eagle Ford Shale, Wolfcamp Shale, as well as tight and conventional oil reservoirs in West Texas and Alaska. The primary focus of this support is in the area of completions and stimulation technology as well as well construction for completion design. He has worked in well completions and stimulation for over 34 years and has worked in several other areas including R&D, technical support, marketing and field engineering positions. The majority of this focus has been on improving production from unconventional reservoirs such as shale gas and tight gas sands. Schein established the first use of the simultaneous fracturing process (simo frac) in the Barnett Shale. This technique has produced many of the most prolific wells to date in the Barnett Shale. Schein's previous position was as Vice President of Engineering & Technical Operations at Dale Resources, LLC located in Dallas, TX, for over four years. Dale Resources is the leader in the development of urban oil and gas resources. Schein's prior 30 years of experience included working as Region Technical Manager for BJ Services. In this position he was responsible for the daily technical support for the region operations including region and corporate sales personnel. This experience includes providing engineering and design data for products application and equipment. His responsibility also included the treatment design and completions engineering for the East Region, which included North Texas, East Texas, North Louisiana and Mississippi.

Talib Syed, Principal Engineer and President, TSA, Inc.

Talib Syed heads his consulting practice based out of Colorado. Syed has over 35 years of domestic and international experience in oil and gas production operations (both onshore and offshore) and in groundwater and protection of drinking water resources from oil and gas production and injection activities, and has worked in most of the major geological oil and gas provinces in the US. His current areas of work have focused on hydraulic fracturing of tight oil and gas reservoirs (drilling and completion), CO₂ geologic sequestration, slurry fracture injection of drill cuttings/muds and well integrity management (casing design and cement design and execution). He holds a BTech in Chemical Engineering from the University of Madras, India and a MS in Petroleum Engineering from the University of Oklahoma, and is a Registered Professional Petroleum Engineer in Colorado and Wyoming.

D. Steven Tipton, Operations/Completion Engineer, Newfield Exploration Company

D. Steve Tipton is a registered professional engineer in Oklahoma and Texas with over 45 years experience primarily in drilling, completion and production operations throughout the US, Canada, Trinidad and Yemen. He has engineered and supervised the drilling and completion of several hundred horizontal wells in Oklahoma, Texas, Louisiana, North Dakota and New Mexico. He is currently employed by Newfield Exploration in Tulsa, OK. His primary responsibilities have included drilling, completion, production and water management for the company's operations. Tipton is a primary mentor for newly hired engineers and summer interns, and provides

technical expertise to the company's engineering staff. He has made presentations at numerous technical meetings and conferences on water management including the US EPA's Technical Workshops for Hydraulic Fracturing in 2011, Society of Petroleum Engineers Advanced Technology Workshops, the University of Tulsa, the Oklahoma Independent Petroleum Association Unconventional Resource Forum, Oil Sands Water Management Initiatives, Water Management for Shale Plays and in-house training at Newfield for new engineers and geoscientists.

Norman Warpinski, Technology Fellow, Pinnacle - A Halliburton Service

Norman Warpinski has worked for 36 years on hydraulic fracturing, in situ stress, geomechanics, natural fracturing, formation evaluation, hydraulic fracturing diagnostics and many other related petroleum engineering and geosciences areas and applications. The first 28 of those years was at Sandia National Laboratories where he performed lab, field, theoretical and numerical studies for the Department of Energy and the Gas Research Institute (now Institute of Gas Technology); the last eight years have been with Pinnacle Technologies, which was acquired by Halliburton and is now Pinnacle - A Halliburton Service. Pinnacle specializes in hydraulic fracture diagnostics such as microseismic, tiltmeter and fiber optic services, as well as fracture analysis and modeling. Warpinski oversaw and partially developed much of the work flow and software for microseismic monitoring, was a lead investigator in two of the primary research projects on fracturing (the DOE Multiwell experiment and the GRI/DOE M-Site experiment) and has been exposed to the monitoring results of over 15,000 fracture treatments.

Lloyd Wilson, Research and Special Projects Coordinator, Bureau of Water Supply Protection, New York State Department of Health

Lloyd Wilson is an environmental scientist with more than 25 years of research and professional experience focused on preventing human exposure to contaminants in the environment. His work has involved assessing potential sources of exposure to various compounds through different media. He has overseen projects investigating asthma emergency room visits and ambient air pollutants, polychlorinated biphenyls in public drinking water supplies that use the Hudson River as a source of water, mold and indoor air quality issues, climate change and numerous other drinking water quality issues. For the last five years he has been evaluating potential concerns with impacts of high volume hydraulic fracturing (HVHF) used in development of gas and oil wells. Specifically, he has been involved with reviewing all aspects of the New York State Department of Environmental Conservation's HVHF environmental impact statement. He received his PhD from the University at Albany School of Public Health in Toxicology and Occupational Health, where he also currently holds a position as an Assistant Professor.