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SEG (Society of Exploration Geophysicists)

The Society of Exploration Geophysicists is a not-for-profit organization that promotes the science of geophysics and the education of applied geophysicists. SEG, founded in 1930, fosters the expert and ethical practice of geophysics in the exploration and development of natural resources, in characterizing the near surface, and in mitigating earth hazards. The Society, which has more than 25,000 members in 129 countries, fulfills its mission through its publications, conferences, forums, Web sites, and educational opportunities.

EDUCATION

Southern Methodist University (SMU) - 1981 MBA (Masters of Business Administration) Entrepreneurship
University of Utah - 1974 – Bachelor's of Science in Geophysics

PROFESSIONAL EXPERIENCE

An experienced geoscientist in the international petroleum industry with proven success in creating and building new tools for the exploration and production industry. Also formed a consulting company to utilize industry and proprietary tools and processes to explore for, develop, and produce hydrocarbons. Created a university program which placed advanced interactive interpretation systems in many universities worldwide to support research and teaching.

CHRONOLOGY

Geokinetics Processing & Interpretation formerly Geophysical Development Corporation (GDC) April 2004 – Present Vice-President Interpretation Business Development

Working in the prestack depth migration group, improving velocity interpretation procedures. Charged with opening the market for GDC in China, and building an integrated interpretation business to expand Geokinetics, and its former subsidiaries (Quantum Geophysical, Trace, Grant Geophysical, and GDC), into a full-service geophysical contractor supplying integrated seismic acquisition, processing, and interpretation. Product Manager for GDC's TilesTM Studies, a new type of regional rock properties / AVO (Amplitude vs. Offset) context studies designed to allow easy amplitude and AVO evaluation for a specific prospect. This includes introduction of d-TIPS (database Toolkit for Integrating Petrophysics and Seismic), developed by Dr. Fred J. Hilterman.

Dynamic Resources Corporation**Founder/President****January 2001 - Present**

Established to integrate advanced technologies with a NetWork of proven professionals as synergistic multidisciplinary teams for exploration or production projects within specified areas and utilizing proprietary tools and processes. Pursuing technologies to unravel unconventional gas plays in California; Michigan; Louisiana; Texas; Utah; West Virginia; Wyoming; etc.

Walden 3-D, Incorporated**Founder/President****May 1990 - Present**

A consulting company and new company incubator. Started Walden Visualization Systems (the first virtual reality service company for the oil industry), vPatch (providing web-based project management), Advanced Structures Incorporated (building space-frame, fabric, and advanced enclosures), HyperMedia Corporation (the first commercialization of a hypertext browser), and others. Did major seismic interpretation projects in Nigeria, in the United States, in Venezuela, and in New Zealand. Geophysical consulting services now through Geokinetics.

Continuum Resources International Corporation**Co-Founder****September 1997 - August 2000**

Merged Walden Visualization Systems with Energy Innovations to create petroleum industry commercial visualization theaters. Designed software to read from any databases or file with spatial information, and to integrate the displays as a 3-D virtual reality experience. Established display and interaction capabilities, for simultaneous 3-D immersive collaboration in London, England or Perth, Australia and/or Houston, Texas.

The Global Basin Research Network**Co-Founder****September 1992 - November 1994**

Participated in Department of Energy study with Lamont-Doherty Earth Observatory of Columbia University, Cornell University, Louisiana State University, Woods Hole, Penn State, and other universities on dynamic replenishment of the largest Pleistocene oil and gas field in the Gulf of Mexico. Continue to monitor this research, and believe it is applicable onshore.

HyperMedia Corporation**Co-Founder****January 1991 - Present**

Designed, built, and produced a UNIX, X-Windows, Motif, Client-Server hypertext engine, from a prototype built in 1988 at Landmark Graphics. After completion, used it for major projects in the U.S., Saudi Arabia, and New Zealand. Included development of a process model for running the ideal oil and gas company. Geophysical consulting services now through Geokinetics.

Landmark Graphics Corporation**Co-Founder****November 1982 - September 1992**

Designed Landmark Graphics seismic interpretation software. Created worldwide markets with training courses and technical support. Participated in regional and detailed interpretation projects in The United States, Canada, China, Australia, Indonesia, and the North Sea. Established Landmark's University Program, helping students and professors develop new technologies from Australia to Holland, and all across the U.S.

- Excellence of Poster Presentation: "The Stratigraphy, Sedimentology and Chronostratigraphy of the Mobil Bay Fan, Northeastern Gulf of Mexico, coauthored by D. Bradford Macurda, Jr. and Gary L. Jones, SEPM (Society for Sedimentary Geology), 07 March 1995
- Resolution passed by unanimous consent of The Board of Directors of Landmark Graphics Corporation: "... recognizing that the success which the Company has attained has been in large measure do to Mr. Nelson's earnest efforts and untiring devotion ...," 12 January 1995

STATEMENT OF QUALIFICATION:

A. "... employee or representative of independent producers of natural gas and other petroleum [resources], including small producers;"

- My full time job is seismic and velocity interpretation for the third largest seismic acquisition company in the world, Geokinetics, Inc. Prior to going to work for Geokinetics, I started Dynamic Resources Corporation, planning to create an independent producer of natural gas using proprietary advanced exploration technologies. My employment agreement with Geokinetics allows me to retain ownership and involvement in any projects which were started before going to work for Geokinetics. Because Geokinetics is not interested in funding my time to participate on the Unconventional Resources Technology Advisory Committee, if I am selected, I will participate as a representative of the SEG and of Dynamic Resources, and use vacation time to insure there is no impact on Geokinetics.

B. "...extensive research experience or operational knowledge of unconventional natural gas and other petroleum resource exploration and production;"

- My work following co-founding the Global Basin Research Network has convinced me there are certain geologic environments where dynamic replenishment is occurring. Given this is conclusively demonstrated, it means industry can tap a stream rather than a reservoir, where the stream is coming from a deeper unreachable giant reservoir, or possibly, like the giant Elmworth Field in Alberta, gas is being generated and fed into the system faster than it can be produced.

C. "... individual broadly representative of the affected interest in unconventional natural gas and other petroleum resource exploration and production, including interest in environmental protection and safe operations;"

- I have been interested in unconventional gas ever since the second oil crisis of 1979, when the Shah of Iran was deposed, and the Carter administration instituted price controls. I was running seismic crews for Mobil's Exploration Services Center in Dallas, and had to negotiate with government bureaucrats to get gasoline to run our seismic crews in places where they were not located the year before. There was a lot of work with oil shale then, and having interpreted seismic data from major basins all across the world, it was obvious to me we need to find new hydrocarbon sources.
- My consulting company, Walden 3-D, Inc. (<http://www.walden3d.com>), has been involved in many environmental protection issues, starting with by being named after Henry Thoreau's Walden Pond in Massachusetts, where the modern environmental protection movement started in the early 1800's.

D. “... expertise in the various geographic areas of potential supply of unconventional onshore natural gas and other petroleum [resources] in the United States;”

- I spent time working on and running seismic crews for both Amoco and Mobil. We worked in Rock Springs and Green River, Wyoming; on The Great Salt Lake; in Kalamazoo, Michigan; in Hugoton, Kansas; Mesquite, Nevada; northeast of Las Cruces, New Mexico; Findley, Ohio; Sayre, Oklahoma; Cedar City, Utah; Seminole, Pecos, and Laredo, Texas; and Gillette and Big Piney, Wyoming. There is nothing like getting out in the field, and it is important to protect the environment for those who next visit.

CONTRIBUTION TO THE COMMITTEE

I have spent my 35 year career learning how and where to look for hydrocarbons. The interactive workstation technologies I helped develop have changed the way every oil and gas company in the world explores for hydrocarbons. I want to use my experience and technical expertise to create more energy independence for my grandchildren, my family, my state, and my country. As the focal point on several specific government scale research and development projects, I know which projects have the promise of unlocking large quantities of unconventional energy. The Unconventional Resources Technology Advisory Committee has the potential to create a framework for widespread implementation of these technologies and projects, including:

- Government adoption of a spread-sheet GIS tool for easy and semi-automatic distribution of spatial information, which is the basis of all unconventional gas exploration, related examples at <http://www.walden3d.com/H/sample/>.
- Government adoption of an oil industry process model (e.g. <http://www.walden3d.com/d/kb/>), for Indexing Best Practices (e.g. Real Time Drilling: http://www.walden3d.com/og1/node_tree.html)
 - Providing a checklist for improving small producer’s exploration processes.
 - Providing a way to quantitatively monitor and optimize production performance.
 - Providing a documentation framework for an on-line forum - collecting, distributing, and enhancing scientific and experience based advise on energy decision making at the individual, family, community, state, and national level.
- Development of Case Histories demonstrating how the above indices can be used to index and distribute information to small producers to enable them to define where and how to look for unconventional natural gas and other petroleum resources, including:
 - Documenting the distribution of geopressure pods in the Gulf Coast, and their relationship to trapping gas independent of structural or stratigraphic traps.
 - Documenting the viability of dynamic replenishment of oil and particularly gas fields, where dynamic replenishment means the fields are refilled by gas migration up faults or other channels within the lifetime of the field. The GBRN proved this process is occurring in the giant Eugene Island 330 field, and there is a solid scientific basis for this being common in the Gulf Coast onshore.
 - Using seismic velocities to identify basin centered gas; e.g. Green River Basin and Big Horn Basin, Wyoming.
 - Using azimuthal seismic to identify naturally fractured gas reservoirs; e.g. extension of the Bluebell Field in Duchesne and Uintah Counties, Utah.

- Using aeromagnetics to map basement faulting in order to optimally locate fractured reservoirs, e.g. Trenton/Black River Formation in West Virginia.
- Using geostatistics from existing well and formation top databases to define the tectonic impact on chronostratigraphy in order to identify optimal reservoir and seal combinations; e.g. Tertiary Fort Union, Cretaceous Niobrara, Mississippian Lodgepole, Devonian Duperow, and Ordovician Red River of the Williston Basin; or Cretaceous Mesa Verde and Dakota, Jurassic Morrison, and Triassic Moenkopi formations in the Green River Basin.
- Using dendritic horizontal drilling technologies developed for exploiting coal bed methane to produce insitu gas from oil shale; e.g. Barnett Shale, North Texas or the Fayetteville Shale in Arkansas or the Bakken Shale in Wyoming.
- Expansion of the \$50 million Core Repository intuitive at BEG (The University of Texas at Austin's Bureau of Economic Geology) to take advantage of new digital scanning technologies which would provide Internet access to 99% of the information in the cores.
- Evaluation of the viability of having a sugar intensive crop like sorghum cane planted in all farms currently kept fallow because of government subsidies for the purposes of (1) paying the subsidies, (2) generating ethanol, and (3) producing meal as a primary source of food for those on welfare.
- Evaluation of whether the electricity being generated from pipelines in Alaska cutting through the earth's magnetic field, and currently fed into the ground with large cathode protection rectifiers, could be captured and transmitted for public use.
- Evaluation of a worldwide energy grid, and whether connecting the U.S. and Russian electric grids at the Bering Straits would allow the night side of earth to use solar electricity being generated on the day side of the earth.
- Evaluation of whether building geodesic umbrellas and using NASA's Robonaut to control melting of the gas hydrates with hot water or microwave technologies could unlock gas hydrates, the largest known source of hydrocarbons on the planet.
- Formal evaluation of the viability of Solar Chimneys, like the 1981 experiment in Manzanares, Spain, or the plans to build a 1 km (0.62 mile) tower in Mildera, Australia to generate 200 megawatts, or enough energy to power 200,000 homes. It particularly makes sense to take advantage of mountains in the western U.S. where a chimney could be laid up the south side of a 5,000 foot elevation difference between the valley floor and the top of a mountain on Federal land, minimizing cost, and where greenhouses could be laid out like an alluvial fan across the valley floor.

RELATIONSHIP TO THE PROGRAM CONSORTIUM:

- None