DR. HELOISE BLOXSOM LYNN
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Specialty:
The use of multi-component data (PP and PS) collected over anisotropic sedimentary rocks for reservoir characterization and exploration. My recent work documents how to use the anisotropy recorded in wide-azimuth 3D seismic reflection data to distinguish between unequal horizontal stresses and vertical aligned porosity that flows fluids. I also do technology transfer: to train up other geophysicists to do what I do, so that the technology is available within the hiring company. I also work on seismic acquisition design, pre-acquisition modeling, monitoring and quality checking during onshore and offshore acquisition, supervise processing, and interpret data using all available geologic data, for wide-azimuth and multi-component seismic projects. Modelling of field data results, to support interpretation. Also, the specification of required support datasets for a multi-component azimuthal project can be supplied to clients.

Further interests also include: uses of VSP multi-component data in conjunction with 3D multi-azimuth multi-component surveys, and passive seismic monitoring during hydro-frac. Fractured basement reservoir plays: how to use wide-azimuth seismic to efficiently develop these reservoirs, even if the reservoir is in the "non-layered" basement rocks.

Teaching offered on anisotropy and multi-component (acquisition, processing, interpretation): ½ day , 1 day, 3 day courses and/or seminars. Outline of course(s) available upon request.

Experience: **33 years working seismic reflection field data** for oil and gas exploration (1975-2008); **28 years working multicomponent** and/or multi-azimuth **field data** (1980-2008) and applying knowledge of seismic anisotropy to process and interpret seismic field data.

Website: www.lynn-inc.com

Fall 2004: SEG/AAPG Distinguished Lecturer. **"The Winds of Change – Anisotropic Rocks, their preferred direction of fluid flow and their associated seismic signatures."** Videotaped by the Canadian SEG and available upon their website (www.cseg.ca) or www.aapg.org or www.seg.org . The written text is found in The Leading Edge Nov and Dec 2004 issues. A condensed version is found in the October 2004 Recorder (Canadian SEG), pages 5-11.

Co- Editor with Ilya Tsvankin for July, 1999, issue of Geophysics: Anisotropy in P-wave Seismic.

Co-Editor with Colin MacBeth of Applied Seismic Anisotropy: Theory , Background, and

Field Studies, Geophysics Reprint Series, No. 20, published by Soc. of Explor. Geophysicists, 2000.

Consultant work:
Current projects:

- Devon Energy: central Texas unconventional reservoir (organically rich Barnett shale) for gas production.

11/1984 to present: Seismic geophysical consultant.
Formed own company, Lynn Incorporated, March, 1985.
23 years consulting with industry on multi-component, multi-azimuth, and anisotropic topics. "*I have observed that azimuthal anisotropy is a first-order effect in every wide-azimuth multi-component 3D dataset that I have worked during the last 28 years. This situation is taken care of in processing, by azimuth sectoring the P-S data prior to imaging, since very few processing contractors have explicit code for azimuthal anisotropy embedded within P-S 3D wide-azimuth data."*

During the last ten years, I have personally worked 18 (eighteen) 3D PP wide-azimuth field data surveys and/or 3D multicomponent surveys acquired, processed, and interpreted for seismic anisotropy, in order to learn fracture azimuth, fracture density, and in-situ stress state, as the lead geophysicist assigned to the project. There are no other geophysicists available in the open market that have accomplished this.

Recently Finished Projects:

- Occidental Qatar. I was the senior Technical Lead, retained by Occidental Qatar, to guide and direct their two-year project that acquired, processed, and interpreted two offshore 4-component 3D wide-azimuth reflection seismic surveys [VERY high fold], for purpose of fractured reservoir characterization in preparation for flood. I worked for Scott Burns. The azimuthal anisotropy information contained in the P-P and the P-S traveltimes and amplitudes was captured and displayed and interpreted. The characterization and mapping of the vertical aligned fractures that flow fluids was the number one objective for these surveys. This project was completed on-time and only somewhat over budget. This is the only multi-component project that I have ever heard of that was completed on time.

1. Geophysical Manager for the Dept. of Energy project DE-RP21-93MC30086, with the goal of characterizing the natural fractures (orientation, fracture density) in a gas reservoir 4000'-6000' depths, at Rulison Field, Piceance Basin, Colorado. Responsible for: 1) 3D multi-azimuth P-wave seismic design, acquisition (April 1996), processing, and interpretation, using contractor acquisition and contractor processing. ; 2) multi-component VSP re-processing and interpretation; 3) limited multi-component receivers, deployed during 3D shoot (April 1996), processing and interpretation of P-S arrivals.

2. Principal Investigator of the Dept. of Energy project DE-RP21-93MC31224: Naturally fractured tight gas reservoirs detection optimization. This project includes two narrow-azimuth pre-stack time migrations of a 37 square mile 3D P-Wave survey in the Wind River Basin, Wyoming; a 9C VSP to characterize the P and S wave time-depth-velocity-reflection character-anisotropy; the acquisition, processing, and interpretation of a 6 square mile 3D-3 component (receiver) P-wave source (dynamite) survey, to be interpreted for the relationship of P wave anisotropy to S-wave anisotropy in a naturally-fractured gas reservoir (undergoing current development and production). Goals of the project: accurate structure maps in the presence of gas chimneys, relative fracture density maps on horizons of interest, and map-view picture of the orientation of the open fractures for each mapped horizon. This project, started in June, 1994, is scheduled to complete in December, 1997.
3. Principal Investigator of the Dept. of Energy project DE-RP21-91MC28135: Fracture Detection, Mapping and Evaluation of Naturally Fractured Gas Reservoirs Using Surface Seismic Methods. Acquisition, processing and interpretation of 2D 9-component (P, S, and P-S) reflection seismic and 9-C VSP in the Bluebell-Altamont, Utah, naturally fractured gas reservoir (1992-1995).

The above work is available on CD-Rom from the United States Dept. of Energy, Office of Fossil Energy, Federal Energy Technology Center, Pittsburg, PA (editors and publishers): Detection and Analysis of Naturally Fractured Gas Reservoirs, Low-Permeability Reservoirs Project: Summaries and Synthesis of Six Studies, 1998. Contact www.fetc.doe.gov/publications
or Customer Services Line: 1-800-553 –7681 (telephone). Or contact me, and I will be happy to supply you a digital copy of this work.

The reference for the DOE work is Dr. Richard Bates, who was the project manager for two of the three DOE projects. He is currently a professor of geophysics at University of St. Andrews, Scotland. His email address is crb@st-andrews.ac.uk

Subsequent to the publications of the above work, I have applied this technology successfully to exploration/development in Wyoming, So. Texas (Austin Chalk, for two different major oil companies), in the Cooper Basin, Australia, the San Juan Basin for two different companies, and the Adriatic (offshore) for a major oil company.

Lynn Inc. is currently working on its twelvth PP 3D multi-azimuth project for Devon Energy, with many more coming at us. Client: Mr. Mike Ammerman, Devon Energy, Oklahoma City. Email address: mike.ammerman@dvn.com

Multi-component work includes working for eni Agip on the Emilio Field 3D 4-component wide-azimuth multicomponent (full azimuth) offshore data. Three year project. Client: Dr. Laura Vetri, R&D, Eni Agip, Milan, Italy. Laura.vetri@agip.it. The Society of Exploration Geophysicists awarded on Oct. 10, 2004, **Honorable Mention** to one of the write-ups of this work, which I co-authored. “3D/4C Emilio: Azimuth processing and anisotropy analysis in a fractured carbonate reservoir.” Best Paper in The Leading Edge, vol. 22, no. 7, 2003.

Also worked for Lloyd Weathers, on a south Texas 3D multi-azimuth PP study of a fractured reservoir, when he worked for Mobil. His email address is Lloyd_weathers@yahoo. com

3. Consultant to Petroleum GeoServices for acquisition, processing and interpretation of seismic data acquired with vertical cable technology.
4. Part-time consultant for WesternGeco on multicomponent and anisotropy (Aug. 2001 to March 2002).
5. Nine-component VSP zero offset, plus 2-arm walkaway P&S VSPs (two different azimuths) for anisotropy evaluation, for Anadarko. 2001-2002.
6. West Texas – Permian Basin – carbonate reef play, 3D PP processed for azimuthal anisotropy, to determine preferred fluid flow direction from seismic.
7. Worked on 3D PP multi-azimuth seismic reflection signatures in a San Juan dataset, for Univ. of CA Ernest Orlando Lawrence Berkeley National Lab R&D Subcontract No. 649 7603 , on work performed for Contract No. 2-7405-ENG-48 , Contract No. DE-AC03-76SF000 98 with the US Dept. of Energy. 2000-2001.
8. Processed and interpreted multicomponent VSP data from Pakistan, and served as processing quality control for AVO project on (P-wave) reflection seismic data and interpreter for PP AVO project as follow-up for VSP project.
9. Oversaw processing and interpreted two 9-component VSPs (3 sources each into 3 receivers): helped with design of acquisition, directed processing, and performed interpretation (P-P, S1-S1, S2-S2, P-S1, P-S2) for Texas onshore project for fractured reservoirs; associated P-P and S1-S1 and S2-S2 surface reflection seismic interpretation;
7. Taught 3-5 day courses for two oil companies and a contractor: "Fracture Detection Using Geophysical Measurements." (Three times during 1992.)
8. Canadian multi-component VSPs processed and interpreted for in-situ stress orientation determination, and fault trend, and fault presence;
9. Evaluation of wireline P and S velocity data and other borehole geophysical data, including multi-component VSPs processed and interpreted for P and S velocity information, East Texas onshore; incorporation of results from borehole studies into AVO prediction and analysis of P-wave reflection seismic data;
10. Two multi-component VSPs (2 different oil fields) from Pakistan processed and interpreted for P and S wave velocity information, and shear-wave splitting analysis for fracture orientation and in-situ stress direction orientations; integration of VSP results with wireline logs' data, P-wave reflection seismic interpretation, and exploration program;
11. South American multi-component VSPs project: analysis of shear-wave arrivals to test for azimuthal anisotropy. Combined the information from the VSPs into the study of the significant P-wave surface-seismic NMO-velocity azimuthal variation, to help with time-depth problems. Zero-offset VSP and 2 different azimuths offset VSPs processed and analyzed.
12. Anisotropic seismic modeling project using ANISEIS for pre-acquisition testing. VSP geometry. Goal: detection of fractured reservoir. Canada, and Austin Chalk (fractured reservoir), Texas.
13. Directed processing of package of 4 VSPs (one near-offset, three azimuthally

different offsets) to improve P-wave structural imaging and map; we obtained an S-wave velocity model of the earth for AVO modeling work, we documented the presence of shear-wave splitting for max. hor. stress orientation, and evaluated (vertical) vibrator source array effectiveness. See 1990 SEG Expanded Abstracts for my paper. Part of a 9-month south-Texas onshore Frio/Vicksburg AVO analysis.

14. East Texas onshore carbonate stratigraphy interpretation; modeled the P-wave zero-offset reflection response using well control on each end of the line to document that our interpretation results in a seismic section congruent with the field data;
15. Two northern Midland Basin, Texas, strat plays' acquisition design, shooting the P wave seismic, overseeing the processing, interpretation;
16. Northern Midland Basin structural play: seismic interpretation, re-processing and inversion of mid-70's P-wave seismic data which greatly clarified the stratigraphy and the structures on the line;
17. South Texas structural play acquisition design, seismic acquisition, processing, interpretation;
18. Goliad County, TX, Wilcox structural-stratigraphic re-processing and interpretation project;
19. Quality control in processing 20 lines, and data-processing problem solving, for offshore marine project, processed at Digicon, Houston, TX;
20. Worked for the (now retired) Western Geophysical Sr. Vice President, Carl Savit, as technical editor and writer, on the Fourth Edition of Dobrin's Introduction to Geophysical Prospecting. I wrote the chapters on seismic processing and interpretation.

Oil company work experience:

1/1980- 6/1984:	Exploration geophysicist, Amoco Production Co., Houston, TX.
1/84-6/84:	Regional seismic stratigraphic interpretation project in the Midland Basin (Clearfork).
1981-1982:	Applied research in shear-wave reflection data acquisition, processing, and interpretation techniques. Co-authored patent for Amoco on shear-wave techniques for exploration/exploitation. [See Geophysics, v. 54, 1989, p. 1508, attached to end of this document.]
1980	Appalachia (East Coast, USA) overthrust belt seismic processing and interpretation.
6/1975-9/1976:	Texaco, Inc. Houston, TX, Seismic data processing.

Academic qualifications:

- Ph.D. Geophysics, in reflection seismology, Stanford Univ., Stanford, CA.
- (12/1979) Ph.D. thesis: "Migration and interpretation of deep crustal seismic reflection data." I completed my MS and PhD in three and 1/3 years at Stanford University: no other student in geophysics had ever done this, nor any since. (-personal communication, Dr. George Thompson, Stanford Univ.)
- M.S. Exploration Geophysics, Stanford Univ. (12/1977) M.S. thesis: "Seismic stratigraphic response of a carbonate gas reservoir, LA."
- B.A. Geology-Math, magna cum laude, 6/1975. Also magna cum laude in geology. Bowdoin College, Brunswick, Maine.

Publications:

Lynn, Heloise, and Simon, S., Pau 2005 [Review of EAGE-SEG Summer Research Workshop 2005], The Leading Edge, vol. 25, pp. 950 ff. 2006.

Liu, E., M. Chapman, J. Queen, H. Lynn, Kinematic and dynamic anisotropy: implication of seismic fracture characterizations, accepted for 2006, Annual SEG Meeting.

Lynn, H.B., . **"The Winds of Change – Anisotropic Rocks, their preferred direction of fluid flow and their associated seismic signatures." , The Leading Edge,** Nov and Dec 2004**.** Videotaped by the Canadian SEG and available upon their website (www.cseg.ca) or www.aapg.org or www.seg.org .

Lynn, H.B., and Cox, D., 2003, P-wave AVOA interpretation needs the input of additional information, Annual SEG Meeting 2003 Expanded Abstracts.

Lynn, H.B., Where you sit governs what you see, and following two articles. Canadian SEG's The Recorder, July 2003.

Vetri, L., Loinger, E., Gaiser, J., Grandi, A. and Lynn, H., 3D/4C Emilio: Azimuth processing and anisotropy analysis in a fractured carbonate reservoir, The Leading Edge, V. 22, pp. 675 ff. 2003.

Lynn, H., Stewart, R., Garotta, R., and Thomsen, L., 4C-ing the future—a word from the "gurus", The Leading Edge, vol. 20, pp. 978 ff, 2001.

Lynn, H.B., Overlap! OTC 2000 and the 9th International Workshop on Seismic Anisotropy, The Leading Edge, vol. 19, August 2000, pp 874-876.

Lynn, H.B., L. Weathers, W. Beckham, The Mobil Onshore Texas 3D full-azimuth full-offset P-wave survey, 9th Inter. Workshop on Seis. Anis., Abstract at http://9iwsa.seg.org/abstracts, 2000.

Grimm, R.E., H.B. Lynn, C.R. Bates, D.R. Phillips, K.M. Simon and W.E. Beckham, Detection and analysis of naturally fractured reservoirs: Multiazimuth seismic surveys in the Wind River basin, Wyoming. Geophysics, Vol. 64, N°4 (July-August 1999), p.1277-1292

Lynn, H.B., D. Campagna, K.M. Simon, W. Beckham, Relationship of P-wave seismic attributes, azimuthal anisotropy, and commercial gas pay in 3-D P-wave multiazimuth data, Rulison Field, Piceance Basin, Colorado. Geophysics, Vol. 64, N°4 (July-August 1999), p.1293-1311

Lynn, H.B., W.E. Beckham, K.M. Simon, C.R. Bates, M. Layman and M. Jones, P-wave and S-wave azimuthal anisotropy at a naturally fractured gas reservoir, Bluebell-Altamont Field, Utah. Geophysics, Vol. 64, N°4 (July-August 1999), p.1312-1328.

Lynn, H.B., W. Beckham, P-wave Azimuthal Variations in Attenuation, Amplitude, and Velocity in 3D Field Data: Implications for Mapping Horizontal Permeability Anisotropy, SEG International Exposition and 68th annual meeting, Technical Program, Sept 1998, New Orleans, LA, p.193-196.

Grimm, R.E., H.B. Lynn, C.R. Bates, G.M. Mavko, V. Kuuskra, Detection and analysis of naturally fractured gas reservoirs , SEG International Exposition and 68th annual meeting, Technical Program, Sept 1998, New Orleans, LA, p. 940-943.

Lynn, H.B., M. Simon, W. Beckham, V. Kuuskraa, D. Decker, Case History: Rulison Field, CO, Fracture detection, Mapping, and analysis of a naturally fractured gas reservoir using P-wave reflection seismic, SEG International Exposition and 67th Annual Meeting Nov. 1997, Expanded Abstracts, Dallas, TX, p. 202-205.

Decker, D., S. Squires, V.A. Kuuskraa, H.B. Lynn, Structural application of high fold, multi-azimuth 3.D P-wave seismic to target subsurface natural fractures in the Rulison Field, Piceance Basin, SEG International Exposition and 67th Annual Meeting Nov. 1997, Technical Program,, Dallas, TX, p. 824-826.

Van Dok, R.R, J.E. Gaiser, A.R. Jackson, H.B. Lynn, 3-D converted-wave processing: Wind River Basin case history, SEG International Exposition and 67th Annual Meeting Nov. 1997, Technical Program, Dallas, TX, p. 1206-1209.

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Grimm, R.E., H.B. Lynn, Effects of acquisition geometry, large-scale structure, and regional anisotropy on AVOA: an example from the Wind River Basin, SEG International Exposition and 67th Annual Meeting, Nov. 1997, Technical Program, Dallas, TX, p. 1997-2000.

Bates, R.C., D. Phillips, E. Lavely, H.B. Lynn, Near surface variability in shear wave velocity anisotropy, SEG International Exposition and 66th Annual Meeting, Nov. 1996, Technical Program, Denver, CO, p. 739-742.

Lynn, H.B., K.M. Simon, C.R. Bates, R. Van Dok, Naturally fractured gas reservoirs' seismic characterization, SEG International Exposition and 66th Annual Meeting, Nov. 1996, Technical Program, Denver, CO, p. 360-363.

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Stawicki, A., and H.B. Lynn, Effects of complex tectonic strain observed in two multi-component VSPs from Pakistan, 1996, Seismic Anisotropy [Proceedings of the 6IWSA], E. Fjaer, R. Holt, J. Rathore, ed.s, Soc. of Explor. Geophys., p. 645-683.

Naturally Fractured Gas Reservoirs, **The Leading Edge**, **August 1996, Vol. 15, No. 8**, Issue highlighting the DOE research into naturally fractured gas reservoirs' seismic signatures. Guest editors: H.B. Lynn and Michele Simon. This issue contained:
Azimuthal anisotropy in P-wave 3D (multiazimuth) data, by H.B. Lynn, K.M. Simon, C.R. Bates, and R.R. Van Dok (Wind River, WY, 3D dataset);
Correlation between P-wave AVOA and S-wave traveltime anisotropy in a naturally fractured gas reservoir, by H.B. Lynn, K.M. Simon,and C.R. Bates (Bluebell-Altamont, Uintah Basin);
Naturally fractured tight gas reservoir detection optimization: Piceance Basin, by V. Kruuskra, D. Decker, S. Squires, and H.B. Lynn (Rulison Field, Piceance basin).

Lynn, H.B., K.M. Simon, C.R. Bates, R. Van Dok, Azimuthal anisotropy in P-wave 3D (multi-azimuth) data, Proceedings of the 3rd SEGJ/SEG International Symposium on Geotomography-Fracture Imaging, Nov. 1995, Tokyo, Japan, p. 441-448.

Lynn, H.B., K.M. Simon, J.H. Queen, Shear wave anisotropy and its relationship with preferred direction of flow, Proceedings of the 3rd SEGJ/SEG International Symposium on Geotomography-Fracture Imaging, Nov. 1995, Tokyo, Japan, p. 433-440.

Lynn, H.B., K.M. Simon, C.R. Bates, M. Layman, R. Schneider, M. Jones, Characterization of a naturally fractured tight gas reservoir using multicomponent seismic data, Proceedings of the 3rd SEGJ/SEG International Symposium on Geotomography-Fracture Imaging, Nov. 1995, Tokyo, Japan, p. 39-46.

Lynn, H.B., C.R. Bates, K.M. Simon, and R. Van Dok, The effects of azimuthal anisotropy in P-wave 3-D seismic: 65th Annual International Meeting, Nov. 1995, Society of Exploration Geophys., Expanded Abstracts, p. 727-730.

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Lynn, H.B., Field measurements of azimuthal anisotropy: First 60 m, San Francisco Bay area, CA, and estimation of the horizontal stresses' ratio from V_{S1}/V_{S2}, Geophysics, v. 56, p. 822-832, 1991. Also presented at the 1989 SEG Research Workshop, Snowbird, UT, The Recording and Processing of Vector Wavefields.

Lynn, H.B., and M. McCardle, Four 3-component VSPs from South Texas Onshore: S-wave Velocities for AVO, and Discussion of Acquisition Parameters, Exp. Abs. 1990 SEG Meeting, p. 52-55, 1990.

Lynn, H.B., and L. Thomsen, Reflection shear-wave data along the principal axes of azimuthal anisotropy, Geophysics, v. 55, p. 147-156, 1990; also presented at the 1986 Annual SEG Meeting (Exp. Abs., p. 473-476).

Patent: U.S. 4,817,061: Seismic surveying technique for the detection of azimuthal variations in the earth's subsurface. Richard M. Alford, Heloise B. Lynn, Leon A Thomsen. Issued: 28 Mar 89. Appl: 20 Jul 84. Assign: Amoco Corp. See Geophysics, Nov. 1989, p. 1508, Patent Abstracts.

Lynn, H.B., Shear-waves, multicomponent seismic, and anisotropy: what information about the earth can we extract? in Geophysics and Computers: A Look to the Future, Houston Area Research Center symposium held April 27/28, 1989. Contact: Geotechnology Research Institute, 4802 Research Forest Dr., The Woodlands, TX 77381 for the Proceedings; or H.B.Lynn for a copy of this paper.

Lynn, H.B., A review: SEG/AGU Chapman Conference--Seismic Anisotropy of the Earth's Crust, The Leading Edge, p. 64, Oct. 1988.

Crampin, S., and H.B. Lynn, Shear-wave VSPs: a powerful new tool for fracture and reservoir description, paper no. 16866, SPE Annual Meeting (see Abstracts), 1987; also, Jour. Petr. Tech., March 1989, p. 283-288.

Lynn, H.B., Seismic detection of oriented fractures, Oil and Gas Journal, Aug. 4, 1986, p. 54-55.

Lynn, H.B., S. Quam, and G.A. Thompson, Depth migration and interpretation of the COCORP Wind River, Wyoming, seismic reflection data, Geology, v. 11, p. 462-469, 1983.

Lynn, H.B., and S. Deregowski, Dip limitations on migrated sections as a function of line length and recording time, Geophysics, v. 46, p. 1392-1397.

Lynn, H.B., L.D. Hale, and G.A. Thompson, Seismic reflections from the basal contacts of batholiths, J. Geoph. Res., v. 86, p. 10633-10638, 1981.

Member of:
Society of Exploration Geophysicists (1977...)
American Association of Petroleum Geologists (1976...)
Society of Petroleum Engineers and Gulf Coast section of the SPE
Geophysical Society of Houston and Houston Geological Society

References:

Dr. John Queen, Ponca City, OK 74602 , Tel. (580) 765 9846.

Non-exclusive reports offered for sale:

1) Report and Comments on the 1991 SEG Research Workshop, July 28 through August 1, 1991, in St. Louis, MO: "Lithology: Relating Elastic Properties to Lithology at all Scales". Cost: $450.00

2) Report and Comments on the Midwest Sectional SEG meeting, March 18-19, 1991, Tulsa, Oklahoma. Papers of interest dealt with: lithology mapping and rock properties; borehole geophysics; and Austin Chalk/fractured reservoirs; and others. Cost $250.00.

3) Report and Comments on the 4th International Workshop on Seismic Anisotropy, Edinburgh, Scotland, July 2-July 6, 1990. The report contains a four-page summary review of the best and most important papers, 25 pages of typed notes that I took during the workshop, the Abstracts, List of Participants, and some handouts from speakers. Cost: $500.00

4) Report and Comments on the 5th International Workshop on Seismic Anisotropy, Banff, Alberta, Canada, May 17-May 22, 1992. The report contains 22 pages of organized comments from my typed notes that I took during the workshop, the Abstracts, List of Participants, and some handouts from speakers. Cost: $500.00

5) The Detection of Fractures Using Geophysical Techniques, Principally Seismic, from the Surface and with Borehole(s): A Review of the Literature and Current Practices. A discussion of the geophysical measurements useful for fracture characterization, both before and after the well is drilled. Review of pertinent articles from Geophysics, Geophysical Prospecting, Jour. of Petr. Tech., etc.) Cost: $4500.00 This report contains, as subsets, the reports listed above.

The purchasing company may copy the Report(s) for internal company use. Persons outside the purchasing company would obtain copies only through Lynn Inc.

In-House Seminars/Short Courses on Anisotropy, Shear-Waves, and/or Multi-component Seismic offered.

Technology Surveillance: For interested clients, I attend, note-take, and report back on

multi-component and/or anisotropy workshops, conferences, and the Annual SEG convention.