

Kenneth E. Arnold, P.E., N.A.E.

POSITION: President, K Arnold Consulting, Inc.
Senior Technical Advisor, WorleyParsons

EDUCATION: M.S. Civil Engineering, Tulane University, 1967
B.S. Civil Engineering, Cornell University, 1964

AWARDS: National Academy of Engineering
Elected 2005
National Academy of Construction
Elected 2014
Society of Petroleum Engineers:
DeGoyler Medal
Honorary Membership
Public Service Award
Distinguished Lecturer (Three Times)
American Petroleum Institute:
Citation for promoting offshore safety
American Society of Mechanical Engineers
Ross Kastor Educators Award
Offshore Energy Center:
Pioneering Technology Award for API RP 14C
Pioneering Technology Award for API RP 75 (2014)
Texas Society of Professional Engineers
Houston Engineer of the Year, 2003
Offshore Technology Conference
Individual Distinguished Achievement Award (2013)

SUMMARY OF EXPERIENCE:

Kenneth E. Arnold has fifty years of industry experience with 16 years at Shell Oil Company. He founded Paragon Engineering Services in 1980 which was purchased by AMEC in 2005. Ken retired from AMEC in 2007 and is currently a Senior Technical Advisor for WorleyParsons and an independent consultant providing project management, facilities engineering and engineering management consulting to the oil and gas industry. He has taught two classes in facilities engineering in the University of Houston Petroleum Engineering school, and currently teaches facility engineering classes at WorleyParsons, Technion University in Israel, as well as for industry clients.

Ken has served as project manager, research manager, facilities engineering supervisor and facilities engineer on many projects. He has consulted on facility design, safety management and engineering management for IOCs, NOCs and independent oil companies. Ken is co-author of two textbooks (“Surface Production Operations, Volumes 1 and 2”) and five field manuals published by Elsevier, was editor of the “Facilities and Construction Engineering” volume of SPE’s Petroleum Engineering Handbook and over 50 technical articles.

He was chair of a National Research Council committee advising the Department of Interior on how to evaluate the effectiveness of Safety and Environmental Management Systems and

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served as an advisor to the DOI on the 30-Day Interim Report to the President on the Macondo well blowout.

Ken was SPE's first Technical director of Projects, Facilities and Construction and has served four years on their Board as VP Finance. He has served on the Board of The Academy of Medicine, Engineering and Science of Texas. Ken is currently serving as TAMEST's Vice President and will be the 2015 President. He serves on the engineering advisory committees of Cornell and Tulane Universities and the Petroleum Engineering Advisory Board of the University of Houston.

K Arnold Consulting- 2007 to Present

Principal performing investigations and consulting services to the energy industry in the fields of engineering and technology, management, operational safety, field development and facilities design, etc.. Recent and ongoing assignments include performing a "cold eyes review" of a conceptual study for an offshore frontier development, peer review of various projects for operators and manufacturers, investigating safety incidents utilizing TapRoot system, and helping formulate a plan of development and execution strategy for a new oil company offshore West Africa and one offshore Cyprus.

Mr. Arnold was a member of the Marine Board of the National Research Council (Washington, DC), and a member of the Board of the Center for Marine Transport of CNG (St. Johns Newfoundland).

WorleyParsons- 2009 to Present

Senior Technical Advisor providing advice to projects and training for young engineers. Projects have included Gulf of Mexico, offshore Canada, offshore Brazil and Peru, Offshore Russia and onshore shale oil projects in US and Europe.

AMEC Paragon– 2005 to 2007

Senior Executive Vice President responsible for advising the President on the operations of AMEC Paragon with an emphasis on strategic planning, customer relationships and human resources. AMEC Paragon is a 600-person U.S. operations office for U.K. based AMEC. Also a member of the Board of Paragon Angola in Angola.

AMEC Natural Resources – 2005 to 2007

Chief Engineer responsible for advising the Managing Director on the state of engineering within this global project management and services company. Emphasis is on assuring best practices are shared, work is distributed as appropriate to the various engineering centers and serving as an ombudsman for the engineering staff.

Paragon Engineering Services, Inc. – 1980–2005

Founded Paragon Engineering Services, Inc. in May of 1980, and served as **President** and **Chief Executive Officer**. Taught various in-house production facility design courses for major oil companies in the US and abroad. Served as an instructor in petroleum engineering at the University of Houston.

Named SPE Distinguished Lecturer in 1994 on Process Safety Management and in 2003 on Facilities and Construction. Presented with the 1998 Production Engineering Award by the SPE. Honored with a Citation for Service award by the Exploration and Production Department of the American Petroleum Institute. Appointed to Board of Directors of SPE as Specialty Director of Facilities and Construction (2001–2004). Named Houston's 2003 Engineer of the Year by the Texas Society of Professional Engineers. Appointed to a three-year term on the Marine Board of the Transportation Research Board, a division of the National Research Council (2004–2007). Appointed in January 2005 to the City of Houston Reinvestment Zone #17 Board of Directors. Received the 2006 SPE Public

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Service Award, and the 2007 DeGolyer Medal. Was awarded honorary Membership in SPE in 2008.

Co-authored two-volume "Surface Production Operations" textbook series and authored two chapters in the 1987 SPE *Petroleum Engineering Handbook*. Served as Editor of the SPE Facilities Engineering reprint series. Authored or co-authored more than 50 technical articles, which have been published in the *Journal of Petroleum Technology*, the *Oil & Gas Journal*, the *SPE Production and Facilities and Construction Journal*, and *World Oil*. Editor for Volume III of the 2007 Edition of the Petroleum Engineering Handbook, "Facilities and Construction".

Served as a consultant to the American Petroleum Institute (API), the Offshore Operators' Committee (OOC), and several industry-sponsored research projects on the design of oil and water processing systems. Chaired the API RP 14J (Design and Hazards Analysis for Offshore Production Platforms) committee as well as the original OOC sub-committee that provided guidance and oversight for the development of the API 14 series of offshore safety documents, including RP 14C (Surface Safety Systems on Offshore Platforms) and RP 14E (Production Platform Piping Systems). Also served as a member of the API RP 75 (Safety and Environmental Management Programs) committee, the API Task Group on Erosional/Corrosional Velocity Criteria, and the Marine Board Committees on Inspection Alternatives for Outer Continental Shelf Operations (1990) and Risk Assessment and Management of Marine Systems (1997).

Chaired or served on numerous SPE Committees including the Facilities Engineering Committee, the Offshore Committee, two Forum Series Committees, the *JPT* Editorial Committee and the Ferguson Medal Committee. Also served as Review Chairman and Executive Editor for the *SPE Production and Facilities Engineering Journal*.

Project Manager for various design and construction projects and conceptual studies, including both onshore and offshore production development systems. Manager of numerous projects and research efforts in the field of separation, oil dehydration, and produced water treating systems design. Author of several papers concerning safety of production facilities and Paragon's PG-HAZOP system for process hazards analysis. Developed Paragon's industry-sponsored production facility design software system and initiated many of Paragon's training courses.

Shell Oil Company- 1964-1980

Work included offshore platform design, production facility design, and project execution. Assignments included offshore, onshore, and marsh platforms and facilities as well as provision of engineering support for operations.

Engineering Manager: responsible for 150 engineers in one of the company's five domestic divisions. Responsibilities encompassed geological, reservoir, drilling, production, facility, chemical, and gas plant engineering.

Research Manager: responsible for offshore facilities, drilling and production engineering research at Shell Development.

Division Mechanical Engineer: responsible for all surface engineering and construction activities in the Gulf of Mexico, including all new platform-based developments and operations support for existing fields.

Facilities Engineering Supervisor: responsible for a section of facilities engineers in the offshore area of the Gulf of Mexico. Developed Shell's Typical Facility approach to design and construction of offshore facilities. Authored in-house papers on flaring options, design of facilities, sand transportation in pipelines, and effect of mud movements on pipelines.

Project Engineer: various assignments in E&P Transportation and Supplies and Manufacturing Engineering including the following:

Site development planning for a grass-roots refinery including site selection alternatives, planning for source water, hurricane protection, and site environmental concerns.

Modeling EOR crude oil supply system incorporating local supply/demand forecasts and pipeline systems with imputed tariffs.

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- Developing pricing model for aviation turbine fuel.
- Writing various industry reports on the impact of emerging technology on deepwater oil development.
- Designing several platforms in the Gulf of Mexico.
- Developing tool for estimating preliminary environmental forces at any location in the U. S.
- Design and project management of numerous facilities engineering projects.

List of Publications and Presentations

Books

1. *Petroleum Engineering Handbook*, Society of Petroleum Engineers, 2007, Editor, Facilities Engineering Volume.
2. *Chakrabarti - Handbook of Offshore Engineering*, Volumes I & II, 2005 Chapter 10: "Topside Facilities Layout Development", Kenneth E. Arnold
3. "SPE Reprint Series No. 25: Production Facilities," Kenneth E. Arnold, Editor, 1989 Edition.
4. *Surface Production Operations, Volume 2: Design of Gas-Handling Systems and Facilities*, Kenneth E. Arnold and Maurice Stewart, Gulf Publishing Company, 1989.
Volume 2: Second Edition, October 1999.
5. *Petroleum Engineering Handbook*, Society of Petroleum Engineers, 1987
Chapter 15: "Surface Facilities for Waterflooding and Saltwater Disposal," Kenneth E. Arnold.
Chapter 19: "Crude-Oil Emulsions," H. Vernon Smith and Kenneth E. Arnold.

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6. *Surface Production Operations, Volume 1: Design of Oil-Handling Systems and Facilities*, Kenneth E. Arnold and Maurice Stewart, Gulf Publishing Company, 1986.

Volume 1: Second Edition, April 1998.

Volume 1: Third Edition, September 2008.

7. *Gulf Equipment Guides, Maurice Stewart and Ken Arnold, Gulf Professional Publishing, 2009*

Emulsions and Oil Treating Equipment.

Gas-Liquid and Liquid-Liquid Separators

8. *Field Manuals, Maurice Stewart and Ken Arnold, Gulf Professional Publishing, 2011*

Produced Water Treatment

Gas Dehydration

Gas Sweetening and Processing

Presentations

1. "The Human Factor, process safety and Culture", SPE Gulf Coast Section, March, 2014
2. "Assuring Technical Competence of Projects: The Need for a Professional and Not a Contractual Relationship between Engineering Companies and their Oil Company Clients", Houston Business Roundtable, March 2014
3. "Assuring an Adequate Safety Culture", Topsides and Hulls Conference, Galveston, January, 2013
4. "Are You a Professional or Just an Engineer", SPE Gulf Coast Section, August, 2012
5. "SEMS, Safety Case and Risk Assessment what do they have to do with a Culture of Safety", Effects of Water Depth on Offshore Equipment and Operations Workshop, BSEE and Argonne national Laboratory, Galveston, Nov., 2011
6. "The Complex Relationship of Compliance and Behavior", Offshore Compliance Forum, Galveston, Sept., 2011
7. "Professional Ethics in Offshore Operations", Offshore Technology Conference, May, 2011
8. "Production Operations – the Need for a Safety Case", Safety & Environmental Study Group, SPEGCS, Sept 16, 2011
9. Key Note Address, SPE International Conference of Health, Safety & Environment in Oil and Gas Exploration and Production, Rio De Janeiro, April 12, 2010.
10. "Energy Challenges: Why there isn't an easy solution", Offshore Technology Conference, May 2010
11. "Personnel Availability in the 21st Century", SPE Southwest Oklahoma Section, January 22, 2010
12. "Is it possible to look out for your company's best interest and still be ethical", Rice Global E&P Forum, Dec 11, 2009.
13. "The Engineering Company Conundrum", Rice E&C Forum, June, 2009.

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14. "Are you a professional or just a PE", Texas Society of Professional Engineers, Annual Meeting, June 24, 2008, San Antonio, TX.
15. "Production Facilities", SPE Gulf Coast Section, Oil Patch Orientation, various times in 2007- 2011.
16. *"Is It Possible to Look Out for your Company's Best Interest and Still be Ethical?"*, SPE Distinguished Lecture, Fort Worth, TX, February 22, 2007; Bakersfield, CA, March 5-6, 2007; Santa Maria, CA, March 7, 2007
17. *"Integrating Design, Scheduling and Document Control Around the Global"*, Upstream CIO, October 25, 2006
18. *"Educating the Engineers and Designers of the Future"*, ISEIT 2006, October 23, 2006
19. *"No Longer Are We All White Guys: E&C Personnel Availability in the 21st Century"*, Rice (University) Global E&C Forum, October 17, 2006
20. *"A Historical Prospective of Gulf of Mexico Safety and Environmental Regulations"*, ABS Corporate Technology, October 12, 2006
21. *"Attracting Talent to the Oil & Gas Industry"*, Society of Petroleum Engineers Gulf Coast Section, September 19, 2006
22. *"Engineering Education Needs from a Limited Perspective"*, Cornell University, September 7, 2006
23. *"Key Lessons for a Successful Career"*, Society of Petroleum Engineers; Emerging Leaders Forum, July 31, 2006
24. *"Facilities & Pipeline Automation"*, Society of Petroleum Engineers Iraq Delegation, May 31, 2006
25. *"Key Lessons Learned by an Engineering Entrepreneur"*, Cornell University, April 19-20, 2006
26. *"Facilities Engineering Is it a Necessary Technology?"*, Dominion E&P Engineering, March 26-29, 2006
27. *"Personnel Availability (or Lack of it) In the E&C Industries"*, Rice Global E&C Forum Roundtable, Houston, TX February 3, 2006
28. *"Maximizing Student Success in the 21st Century"*, Spring Branch Independent School District, Houston, TX, January 11, 2005
29. *Analyzing Industry's "Technical Backbone"*, Society of Petroleum of Engineers Annual Technical Conference and Exhibition, Dallas, Texas, October 10, 2005
30. *"Engineering Ethics"*, AMEC Paragon, Inc., Houston, Texas, September 20, 2005
31. *"New Technology and Infrastructure Issues For Developing Deepwater Opportunities"*, IPAA/Hart Offshore E&P Conference, Houston, Texas, May 19, 2005
32. *"The Future of Offshore Facilities and Construction Engineering in Houston"*, Offshore Technology Conference/Energy Leadership and Outlook, Houston, Texas, May 2, 2005
33. *"Is It Possible to Look Out for your Company's Best Interest and Still be Ethical?"*, Society of Petroleum Engineers Gulf Coast Section, Facilities and Construction Study Group, Houston, Texas, April 19, 2005
34. *"Offshore Wind Energy"*, Offshore Wind Energy Collaborative, Washington, DC, April 12-14, 2005

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35. *“Technology Acceptance in the Facilities and Construction Sector”*, Society of Petroleum Engineers, Accelerating Technology Applied Technology Workshop, Montgomery, Texas, March 15, 2005
36. *“Globalization and the Future of Offshore Engineering in Houston”*, Profit Solutions, Inc.-WELCOM, Inc., Houston, Texas, February 23, 2005
37. *“Is It Possible to Look Out for your Company’s Best Interest and Still be Ethical?”*, Texas Society of Professional Engineers, Houston, Texas , February 23, 2005.
38. *“Globalization and the Future of Offshore Engineering in Houston”*, SPE Gulf Coast Section International Study Group, Houston, Texas, November, 9, 2004.
39. *“Key Lessons for a Satisfying Career in Engineering”*, Rice ASCE, Houston, Texas, November 8, 2004.
40. *“Lessons from the Offshore Oil & Gas Industry”*, National Renewable Energy Laboratory (NREL) Deep Water Wind Energy Research & Development Planning Workshop, Washington D.C., October 26-27, 2004
41. *“Contracting Strategies,”* SPE Project Management Workshop, Houston, Texas, June 18, 2004.
42. *“New Technology Enabler or Destroyer,”* SPE Facilities and Construction Applied Technology Workshop, Dubai, UAE, May 23-26, 2004.
43. *“Gulf of Mexico Safety and Environmental Management Systems for Offshore Oil and Gas Producing Systems,”* SPE Facilities and Construction Applied Technology Workshop, Dubai, UAE, May 23-26, 2004.
44. *“Trends in Project Management Technology,”* SPE Facilities and Construction Applied Technology Workshop, Dubai, UAE, May 23-26, 2004.
45. *“Recent & Future Developments in Facilities Engineering”*, Texas A&M University Multiphase Measurement Roundtable and Research Conference, Houston, Texas, May 5, 2004.
46. *“Overview of Surface Facilities and Operations,”* West Coast Petroleum Technology Transfer Council (PTTC) – Facilities Design, Rebuilding, and Repairing Conference, Los Angeles, California, April 22, 2004.
47. *“Is It Possible to Look Out for Your Company’s Best Interest and Still be Ethical?”*, National Association of Purchasing Management, Houston, Texas, January 13, 2004.
48. *“How Modern Technology and Oil Field Realities Are Changing The Face of Engineering Services,”* 2003 Structural Engineers Association of Texas (SEAOT) State Conference, The Woodlands, Texas, October, 17, 2003.
49. *“EDC China – Cheng Dao Xi Field – Bohai Bay, China,”* Heavy Oil Symposium, SPE Gulf Coast Section, Houston, Texas, September, 18, 2003.
50. *“Why Do Engineering Companies Act Like That? – The View From The Nuthouse,”* International Compressed Air & Allied Machinery Committee (ICAAMC) Annual Meeting, Charleston, South Carolina, May 29, 2003.
51. *“Low Cost Offshore Production Facilities,”* SPE’s VIII Latin American & the Caribbean Petroleum Engineering Conference (LACPEC), Trinidad, W.I., April 29, 2003.
52. *“The History and Future of Facilities and Construction Engineering,”* SPE Distinguished Lecturer Series, November 2002 to April 2003.

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Technical Papers

Project Management

1. "Accelerating Technology Acceptance: Is the Industry "Backbone" Strong Enough for Acceptance of New Technology", JPT
2. "Engineering Companies Analyzed," Kenneth E. Arnold, *Hart's E&P*, August 2004.
3. "Frontier Developments, Bringing Best Practices and Risk Management to New Arenas," Kenneth E. Arnold, *Oil & Gas Executive Report*, Vol.3, No.4, 2000.
4. "An African West Coast Application of Gulf of Mexico Design and Project Management Philosophies," Kenneth E. Arnold, Production Separation Systems Conference, April 23-24, 1996.
5. "Project Management Has Varied Formats," Kenneth E. Arnold, John E. Barnes, and Lee D. Danner, *American Oil & Gas Reporter*, September 1994.
6. *Journal of Petroleum Technology* August 1994 (Facilities Engineering) Issue Editor: Ken Arnold.
7. "Design and Construction of Minimum-Cost, Quick-Delivery, High-Quality Offshore Platforms for Independents in the Gulf of Mexico," Kenneth E. Arnold, John E. Barnes, and Lee D. Danner, Society of Petroleum Engineers Gulf Coast Area Meeting and Exhibition, June 21-23, 1994.
8. "Comparison of North Sea and Gulf of Mexico Design Philosophies," Kenneth E. Arnold and Norbert C. Roobaert, Offshore Technology Conference, May 1989.
9. "Gulf of Mexico Construction Facing Capacity Constraints," Kenneth E. Arnold, *Petroleum Engineer International*, October 1988.
10. "Close Supervision Keeps Facilities Upgrade on Time," Kenneth E. Arnold, J. Chris Luppens and John D. Murray, *World Oil*, November 1985.
11. "Turnkey Economics: a Threat to Service Industry Engineering"? Kenneth E. Arnold and George Holman, *Journal of Petroleum Technology*, March 1985.
12. "Modified Turnkey Approach Can Cut Cost of Marsh and Shallow-Water Projects," Kenneth E. Arnold, *Oil and Gas Journal*, December 17, 1984.
13. "How to Manage Installation of Field Production Facilities," Kenneth E. Arnold and Maurice Stewart, Jr., *World Oil*, December 1983.
14. "How to Manage Production Facility Projects," Kenneth E. Arnold and Maurice Stewart, Jr., *World Oil*, November 1983.

General Facility Design

1. "Modest Proposal for New Technology," Ken Arnold, *Offshore*, April 1999
2. "Criteria for Sizing Multiphase Flowlines for Erosive/Corrosive Service," S. J. Svedeman and K. E. Arnold, SPE Production & Facilities Journal, February 1994.
3. "Droplet Settling Theory Key to Understanding Separator-Sizing Correlations," Kenneth E. Arnold and Carlton T. Sikes, *Oil and Gas Journal*, July 21, 1986.
4. "How to Choose a Process," Kenneth E. Arnold and Maurice Stewart, Jr., *World Oil*, June 1985.
5. "How to Size and Select Three-Phase Separators," Kenneth E. Arnold and Maurice Stewart, Jr., *World Oil*, December 1984.
6. "How to Size and Select Two-Phase Separators," Kenneth E. Arnold and Maurice Stewart, Jr., *World Oil*, November 1984.
7. "A Systems Approach to Offshore Facility Design," K.E. Arnold, API Division of Production, Annual Meeting, April 1973.

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Produced Oil and Water Treating

1. "Combining Production Water Treating Devices Boosts Efficiency," Kenneth E. Arnold and Michael Hale, *Offshore*, January 1998.
2. "Water Droplet Size Determination for Improved Oil Treater Sizing," Mary E. Thro and Kenneth E. Arnold, *SPE Production & Facilities*, May 1997.
3. "U.S. Produced Water Discharge Regulations Have Tough Limits," Gordon H. Otto (University of Houston), and Kenneth E. Arnold, *Oil and Gas Journal*, July 15, 1996.
4. "Oil and Grease Discharge Regulations in the United States and Equipment Capabilities," G.H. Otto and Kenneth E. Arnold, Society of Petroleum Engineers Annual Technical Conference & Exhibition, October 22-25, 1995.
5. "Produced Water Treatment: Engineering Requirements and Constraints," Kenneth E. Arnold and Zara Khatib (Shell Oil Company), American Petroleum Institute Workshop to Identify Promising Technologies for the Treatment of Produced Water Toxicity, October 11-12, 1994.
6. "Water Droplet Size Determination for Improved Oil Treater Sizing," Mary E. Thro and Kenneth E. Arnold, 1994 Annual Society of Petroleum Engineers Technical Conference and Exhibition, Sept. 25-28, 1994
7. "Current Status of Membrane Treatment for Produced Water Discharges," Kenneth E. Arnold, Minerals Management Service Information and Technology Exchange Meeting, November 5, 1991.
8. "Droplet-Settling vs. Retention-Time Theories for Sizing Oil/Water Separators," Kenneth E. Arnold and Paul J. Koszela, *SPE Production Engineering*, February 1990.
9. "Equipment and Systems Used to Separate Oil from Produced Water on Offshore Platforms," Kenneth E. Arnold, American Institute of Chemical Engineers, 1987 Annual Meeting, March 1987.
10. "Selecting a Waste Water Treating System," Kenneth E. Arnold and Maurice Stewart, Jr., *World Oil*, May 1985.
11. "How to Size and Select Produced-Water Treating Equipment," Kenneth E. Arnold and Maurice Stewart, Jr., *World Oil*, March 1985.
12. "Determining Heater-Treater Sizes and Heat Requirements," Kenneth E. Arnold and Maurice Stewart, Jr., *World Oil*, February 1985.
13. "Design Concepts for Offshore Produced-Water Treating and Disposal Systems," Kenneth E. Arnold, *Journal of Petroleum Technology*, February 1983.

Process Safety Management

1. "The SAMS Project: Safety Assessment of Marine Systems," McCafferty, D.B., Arnold, K.E. and King, J. Presentation given at Changing Health & Safety Offshore: The Agenda for the Next Ten Years Conference, Aberdeen, Scotland, July 23, 1998.
2. "Safety and Environmental Programs as a Mechanism for Establishing ALARP," Kenneth E. Arnold and Denise B. McCafferty, Offshore Technology Conference, May 5-8, 1997.
3. "An Engineering Contractor's Perspective on API RP 75 and RP 14J," Kenneth E. Arnold, Richard A. Bresler, and Carlton T. Sikes, Offshore Technology Conference, May 1-4, 1995.
4. "Is Requalification of Topsides Facilities Necessary"? - Kenneth E. Arnold, American Society of Mechanical Engineers Offshore and Arctic Operations Symposium, January 29 - February 1, 1995.
5. "Safety Cases: Are They Appropriate for Most Offshore Platforms"? - Kenneth E. Arnold, *Journal of Petroleum Technology*, November 1994.
6. "The Current Status of the MMS SEMP Program," Kenneth E. Arnold, Rick A. Bresler, and Mary E. Thro, Society of Petroleum Engineers Gulf Coast Area Meeting and Exhibition, June 21-23, 1994.
7. "Developing a Process Safety Management Plan for Production Facilities and Gas Plants," Kenneth E. Arnold and Mary E. Thro, 68th Annual Conference and Exhibition of the Society of Petroleum Engineers, Houston, Texas, October 1993.
8. "Implement Platform Safety System with Minimal Effort," Kenneth E. Arnold and Norbert Roobaert, *World Oil*, March 1992.

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9. "Spend Less Time and Money Boosting Platform Safety," Ken Arnold and Carlton Sikes, *World Oil*, Jan. 1992.
10. "Generic HAZOP Would Improve Gulf of Mexico Process Safety," Kenneth E. Arnold and Carlton Sikes, *World Oil*, November 1991.
11. "Actions Needed to Comply with API RP 750: Management of Process Hazards for Offshore Facilities," Kenneth E. Arnold and Norbert C. Roobaert, Society of Petroleum Engineers Annual Technical Conference and Exhibition, October 1991.
12. "Developing a Generic Approach to HAZOPs Analysis of Offshore Production Facilities," Kenneth E. Arnold and Carlton T. Sikes, Offshore Technology Conference, May 1991.
13. "Options for Improving Facility Process Safety in the Gulf of Mexico," Kenneth E. Arnold and Carlton T. Sikes, Petro-Safe, February 1991.
14. "Improving Safety of Production Operations in the U.S. OCS," Kenneth E. Arnold, Paul J. Koszela and J.C. Viles, *World Oil*, July 1990.

List of Patents

1. *Subsea Flow Enhancer*, **Patent Number:** 5,490,562; **Date:** February 13, 1996
2. *Method for Separating Immiscible Liquid*, **Patent Number:** 5,298,167; **Date:** March 29, 1994.
3. *Water Treating Using a Series Coalescing Flume*, **Patent Number:** 4,983,287; **Date:** January 8, 1991.
4. *Water Treating Using a Series Coalescing Flume*, **Patent Number:** 4,935,154; **Date:** June 19, 1990.
5. *Water Treating in a Vertical Series Coalescing Flume*, **Patent Number:** 4,720,341; **Date:** January 19, 1988.
6. *Water Treating in a Vertical Series Coalescing Flume*, **Patent Number:** 4,790,947; **Date:** December 13, 1988.