

## **CURRICULUM VITAE: BENTON F. BAUGH Ph.D., P.E., NAE**

1

President, Baugh Consulting Engineers, Inc.  
Distinguished Adjunct Professor, University of Houston Cullen  
College of Engineering  
Distinguished Visiting Professor, Oklahoma Christian University,  
Mechanical Engineering  
Director, OC Church Growth Institute  
Publisher, The Christian Array E-Magazine  
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Born: October 30, 1942, Harris County, Texas, USA

Education: BSME: University of Houston, 1967  
One Year in MBA program, University of Houston  
MSME: Kennedy-Western University (Non-resident), 1989  
Ph.D., ME: Kennedy-Western University (Non-resident), 1989  
Army Machinist School, 1961  
Continuing education thru numerous technical conferences

Licenses: Registered as Professional Engineer in Texas, Registration #31635

### Summary of Experience from 6-1959 to Present:

50 plus years of oilfield machine design, manufacturing, management, consulting, and expert witness experience at all levels from a junior draftsman to general management. Substantial theoretical and "hands on" experience.

Built Radoil, Inc. from a concept to an ISO 9001 manufacturer of critical offshore equipment with segment dominating patented products, and negotiated the sale of the company to a private equity group.

Has received more than 100 US Patents. Has received numerous industry awards including being a member of the National Academy of Engineering, Fellow of the National Academy of Inventors, Fellow of the American Society of Engineers (ASME), and Fellow of the Marine Technology Society (MTS). Testified in numerous cases as an expert witness up to testifying before Congress after the Macondo blowout.

### PROFESSIONAL EXPERIENCE:

#### 13-1 TO PRESENT

President, Baugh Consulting Engineers, Inc.  
President, Beta Subsea Systems  
Distinguished Adjunct Professor, Mech. Engr., U. of Houston Cullen College of Engr.  
Distinguished Visiting Professor of Mechanical Engineering, Oklahoma Christian U.

#### 11-79 TO 12-12: PRESIDENT

Owned and operated Radoil, Inc. designing and manufacturing oilfield and subsea

products; and own and operated Baugh Consulting Engineers, Inc. doing general consulting engineering services for the oil industry.

Some of the methods by which we have been of assistance to clients have been systems design engineering, risk and reliability analysis, new product conception, patent analysis and preliminary patent searches, expert witness testimony, technical assistance in liability lawsuits, computer based numerical analysis to collect and weigh data then to determine optimum designs, market surveys, working on committees to prepare API Specifications, and drafting subsea regulations for the Canadian government.

The following is a listing of projects accomplished which included market research design, detailing, manufacturing, and testing:

- \* Shearable drill collars
- \* Subsea Flowline Systems
- \* Subsea Riser Stress Joints, Tapered and Straight
- \* Subsea Crane System
  
- \* Subsea Wellhead Connectors, both hydraulic and mechanical
- \* Workover blowout preventer
- \* BOP Choke and Kill Connector
- \* Deepwater riser connectors
  
- \* WAEF system for full ROV control of a subsea BOP Stack.
- \* ROV (Remotely Operated Vehicles) Interfacing profiles
- \* ROV Tooling Systems & ROV Belly Skid Systems
  
- \* Design and prototype testing of the Thruster Flood Control system to eliminate urban flooding in areas such as Houston, Texas
- \* Design and prototype testing of wind energy turbines demonstrating substantially improved performance in all wind conditions
  
- \* Design and fabrication of wax and hydrate remediation facility for DeepStar
- \* Design and fabrication of a hydrate generation test setup
- \* Design and fabrication of a subsea thermal removal test setup
- \* Design and fabrication of a of multiple pipeline pigs for hydrate remediation
  
- \* Reels, MUX, Hydraulic, and fiber optic reels
- \* Winches
- \* Wind Energy
  
- \* Fairing Systems for drilling risers and steel catenary risers
- \* Drilling riser centralizer and all associated components
  
- \* Arctic platforms
- \* Offshore SCR receiving masts
- \* J-Lay Towers to lay pipeline in 5000' of water

- \* Hydraulic Workover (Snubbing) Systems
- \* Power slip assemblies
- \* Steel & Flexible subsea Pipeline Recovery Systems
  
- \* Extended reach pipeline wax blockage remediation
- \* Coiled Tubing Units
- \* Snubbing and Wireline Blowout Preventer
  
- \* Oilfield Service Gas Generation Systems
- \* Ball Valve Systems, Actuators, Remote Subsea Repairs
- \* Extreme temperature service ball and check valves
  
- \* Gate Valve Systems, up to 20,000 p.s.i.
- \* Mud Saver Valves
- \* Downhole Drill Motors
- \* Power Slips and Workover Rotary Tables
- \* Hydraulic Swivels
- \* Pipeline Connectors

The following is a listing of projects accomplished which included market research design, and analysis:

- \* Drilling Shock Subs
- \* Retrievable Whipstock Assemblies
- \* Misalignment Make-up Threads
  
- \* Land Wellhead Systems, Standard and Geothermal
- \* Templates and Template Leveling Systems
- \* Infinite Cycle Life Optimizing Spring Computer Program
  
- \* Subsea Guidelineless/Guideline Drilling Systems
- \* 18 3/4" - 15,000 P.S.I. Wellhead and Casing Hanger Systems
- \* Internal drilling riser centralizer
  
- \* TFL (Thru Flowline) Systems & Diverters
- \* Thruster Flood Control Systems
- \* Non-marking slip assemblies
  
- \* Drive Pipe Connectors
- \* Subsea Control Systems
- \* Environmental Cleanup Systems
  
- \* Components for TLP production systems
- \* Components for Compliant Riser Systems
- \* Subsea Guidelineless/Guideline Completion Systems

**4-1977 TO 11-1979: VICE PRESIDENT AND GENERAL MANAGER**

Beta Division, Brown Oil Tools, Inc. Recruited to establish a hydraulic fabrication division of the corporation from scratch as a separate profit center and to establish a complete business system for review and possible adaptation by the corporation. Directly responsible for all phases of the operation of the business except capital acquisition. Some of the accomplishments of the division were:

1. Doing business at a level of \$3,000,000/year at a profit after thirteen months of operation,
2. Producing enough profit from manufacture to repay overhead cost incurred during setup of the division by the 21st. month of operation,
3. Establishing a computer ready business system to provide the following:
  - a. A part number for every item used or in inventory,
  - b. An order point/order quantity inventory system,
  - c. A complete sales order/quotation system,
  - d. A complete part list/material list/costing system,
  - e. A complete purchase order system, and
  - f. Full production control and routing system.
4. Recruiting and hiring a full staff of personnel,
5. Making a heavy investment in developing new products,
6. Master planning for the 40 acre facility, and
7. A full marketing program including sales, catalogs, magazines, and oil show presentations.

**7-1975 TO 4-1977: VICE PRESIDENT OF ENGINEERING, R&D, AND QC**

Vetco Valve Corporation. Responsible for all engineering, R&D, and QC activities of the corporation. Responsible for the following product lines:

1. Subsea and land gate valves,
2. Land wellhead product line, and
3. Writing a gate valve QC manual approved by Norsk-Hydro (DNV) and Shell Expro.

**6-1968 TO 7-1975: R&D ENGINEER TO AREA GENERAL MANAGER OF ENGINEERING AND PRODUCTION**

Vetco Offshore, Houston. Responsible for engineering, R&D, production, technical sales, quotations, pricing, and QC on subsea completion systems, including:

1. Subsea completion systems (Shell/Lockheed, Union/ Lockheed, Conoco TFL Test Tree, Shell Diverless Tree, Gulf Diverless & Electro-Hydraulic Tree, and Phillips Ekofisk Tree),
2. Subsea Flowline Systems,
3. Sedco 445 BOP Stack and sonar re-entry system,
4. Tubing Hanger Systems,
5. Electro-Hydraulic Control Systems,
6. Gate Valve Projects, and
7. Subsea BOP Stack Rig-ups.

**2-1964 TO 6-1968: DRAFTSMAN TO R&D ENGINEER**

Cameron Iron Works, Houston. Engineering and testing work on the following projects:

1. Computer controlled drilling choke system,
2. Annular Blowout Preventers,
3. Mud Ball Valves, and
4. Land wellhead systems.

**2-1963 TO 2-1964: DRAFTSMAN**

Camco, Inc., Houston. Design and detailing of misc. downhole equipment, mostly packers.

**6-1959 TO 2-1963: DRAFTSMAN**

Bowen Tool Company, Houston. Miscellaneous drafting work on wellhead, fishing, and service tools. (Less 17 months in the Army and one semester at ACU)

**ADVISORY BOARD ROLES (Past and Present)**

OESI Advisory Board (Offshore Energy Safety Institute)

RPSEA Advisory Board (Research Partnership to Secure Energy for America)

Member University of Houston Subsea Engineering Advisory Board

Member, API 6A Land Wellhead and Christmas Tree, API 16D Drilling Well Control Systems, API 17D Subsea Wellhead and Controls

**PROFESSIONAL ORGANIZATIONS AND ACTIVITIES**

Current Society Memberships: NAE, NAI, ASME, & MTS

2006-Present	Chair, MTS Deepwater Field Development Technology
2004-Present	The Academy of Medicine, Engineering, and Science of Texas
1999-Present	National Academy of Engineering
1993-2001	Board of Directors, Offshore Technology Conference
1993-2001	Board of Directors, Offshore Energy Center, currently emeritus
1993 & 1995	Conference Chair, Energy-Sources Technology Conference and Exhibition (ETCE)
1993-1994	President, U of H Engr. Alumni Association
1991-1994	UH Engineering Association Board of Directors.
1989-Present	Officer, ASME/UH OTC Cajun Crawfish Boil
1988-1994	ASME Petroleum Division Executive Committee
1988-1990	OTC Program Committee Chairman for ASME
1977, 82, 89	Chair, ASME Petroleum Subsection
1976, 79, 81	OTC Student Tours Chairman
1977	OTC Pre-Registration Chairman
1958	Eagle Scout

**INDUSTRY AWARDS**

- \* 30 year attendance award, Offshore Industry Crawfish Boil - 2019
- \* Lifetime Achievement Award, UH Cullen College of Engr - 2018
- \* Golden Attendance Award, 50 years, OTC, 2018
- \* ASME Petroleum Division Engineer of the Year, 2013
- \* Fellow, National Academy of Inventors, February 2012
- \* Pioneer in Offshore Industry, Offshore Energy Center, 2012
- \* Fellow in the Marine Technology Society 2011

- \* Distinguished Engineering Alumnus, UH Cullen College of Engr., 2005
- \* ASME South Texas Section Engineer of the Year, 2005
- \* ASME/UH Crawfish Boil Titanium Crawfish Award, 2005
- \* ASME IPTI Silver Patent Award, 2005
- \* Received Outstanding Mech. Achievement Award from 2000 OTC (W/Stolt)
- \* Elected to National Academy of Engineering, 1999
- \* Outstanding Service Award, ASME South Texas Section, 1998
- \* 1995 Volunteer of the Year, U of H Cullen College of Engineering
- \* Fellow in American Society of Mechanical Engineering
- \* ASME Petroleum Division Ten Paper Cup, 1991
- \* Edgar Pavia Award, Region X, ASME, 1990
- \* Arthur Lubinski Award, Outstanding M.E. Paper @ 1990 OTC
- \* Award of Merit, Outstanding Mech. Engr. Achievement @ 1990 OTC
- \* Meritorious Award for Engineering Innovation, Petr. Engr. Intl. Magazine, 1990
- \* Meritorious Service Award, South Texas Section, ASME, 1988
- \* Dedicated Service Award, National, ASME, 1988
- \* Ralph James Award for ETCE Program Development, 1987

**TECHNICAL PAPERS WRITTEN (34)**

- \* "Substantially Improved Wind Power Performance, 2019 Offshore Technology Conference #29470, Baugh, Whaley, et.al.
- \* "Improving Coiled Tubing Safety with An Autopark Brake", Baugh, Huang, and Crawford, 2017 Underwater Intervention Conf.,
- \* "Pipe Crossing Protection of Subsea Pipelines", Baugh, Pasztor, and VanderLinden, 2017 Underwater Intervention Conf.,
- \* "Synthetic Rope Pipeline Remediation Pigs", Broussard, Pugh, Baugh, and Crawford, 2017 Underwater Intervention Conf.,
- \* "Failsafe Slips on Synthetic Rope", Baugh, 2014 Underwater Intervention Conf., N.O.
- \* "Capabilities and Innovations in IWOCS Reels", VanderLinden, Baugh, Schmidt, and Compton, 2014 Underwater Intervention Conf., N.O.
- \* "Application of BOP Stack Interfaces on Subsea Completion Systems", Baugh, Crawford, and Schmidt, 2013 Underwater Intervention Conf., N.O.
- \* "Non-Invasive Location and Removal of Hydrates in Subsea Pipeline", Crawford and Baugh, 2013 Underwater Intervention Conf., N.O.
- \* "Post-Macondo BOP Safety Upgrades", 2011 OTC Rio # 22407, Baugh, Vozniak, and Schmidt
- \* "Constant Differential Accumulators for ROVs", Baugh, Underwater Intervention – 2007, New Orleans, LA.
- \* "Design and Construction of Gimbaling J-Lay Tower", Baugh, Marine Construction 2001 Conference, Houston.
- \* "Detection and Removal of Hydrates by Subsea Thermal Units", Warren and Baugh, 17047, 2001 ASME/ETCE, Houston.
- \* "Impact of Coiled Tubing Elasticity on Extended Reach Remediation", Baugh and Crawford, 17051, 2001 ASME/ETCE, Houston.
- \* "Review of DeepStar CTR 3202 Testing History, Baugh and Crawford, 17052, 2001 ASME/ETCE, Houston.
- \* "Platform Equipment and Operations for Extended Reach Remediation", Crawford,

- Crawford, and Baugh, 17044, 2001 ASME/ETCE, Houston.
- \* "Superior History of Pipeline Remediation", Crawford, Crawford, and Baugh, 17048, 2001 ASME/ETCE, Houston.
  - \* "Review of DeepStar CTR 3202 Testing History", Baugh and Crawford, 17052, 2001 ASME/ETCE, Houston.
  - \* "The Relationship Between Lubricant Viscosity and Classic Friction", Baugh and Warren, 1999 ETCE.
  - \* "Extended Reach Pipeline Blockage Remediation", Baugh, Illeman, Crawford, McStravick, and Warren, 1998 OTC 8675
  - \* "Testing and evaluation of coiled tubing methods to remove blockages from long offset subsea pipelines", Baugh, McStravick, Warren, and Clark, 1997 OTC 8524
  - \* "Status of Pipeline Blockage Remediation Study", Baugh, McStravick, and Warren, 1997 ETCE.
  - \* "Testing and Evaluation of Coiled Tubing Methods to Remove Blockages from Long Offset Subsea Pipelines", 1997 OTC
  - \* "Deepwater Pipeline Recovery Systems (Steel & Flexible), McStravick & Baugh, 1997 Energy Week
  - \* "Concept for Diverless Tie-In of Submarine Pipelines to the Troll Phase I Platform in the Norwegian Sector of the North Sea", DOT 1993
  - \* "ROV Capabilities for TLP Support, Including API 17D Tooling Systems", 1993 ETCE
  - \* "Results of Standardized Testing on Valve Repair Sealants Used In Subsea Service", OTC 6697, 1991 OTC
  - \* "RU (ReUsable) Profile - Second Generation Applications", 91-PET-32, 1991 ETCE.
  - \* "Paraffin blockage remediation techniques in subsea pipeline repair and design considerations", 1990
  - \* "Systems for ROV Actuation and Repair of Pipeline Ball Valves", OTC 6353, 1990 Offshore Technology Conference.
  - \* "Theory, History, and Results on Sealants for Subsea Service, OTC 6393, 1990 Offshore Technology Conference
  - \* "New Developments in Public Domain ROV Interfaces for Subsea Completion Systems", 1990 ETCE
  - \* "The Economic and Design Impact of Standardized ROV and Diver Interfaces on Subsea Completion Systems", OTC 6044, 1989 Offshore Technology Conference.
  - \* "A Practical Diver Operated Flowline Pull-In System Featuring Standardized Interfacing", 1988 ETCE.
  - \* "Predictive Risk Analysis for Subsea and Floating Production Systems", 1987 ETCE.
  - \* "Deepwater Guidelineless Subsea Completion Systems: A Review of the State of the Art", 1985 ETCE.
  - \* "A New Generation 18 3/4" - 15,000 p.s.i. Subsea Wellhead System", SPE 11176, 1982 SPE.
  - \* "Mudline Emergency Shutoff System", OTC 1862, 1973 Offshore Technology Conference.

**PATENTS ISSUED**

Has received more than 150 US patents on a variety of subjects including hydrate remediation, j-lay towers, reels, pipeline remediation systems, gas compressor systems, pumps, drilling chokes, subsea wellhead systems, wellhead connectors, tubing hangers, subsea flowline systems, gate valves, hydraulic control systems, electro-hydraulic control systems, subsea re-entry systems, riser buoyancy systems, coiled tubing units, power slips, and consumer products.

Other patents are pending and other concepts are having patents applied for.

**EXPERT WITNESS ACTIVITIES**

Have served as an expert witness on 19 lawsuits including patents, trade secrets, product failures, safety, and personal injuries. Have been deposed several times and qualified in court as an expert in mechanical engineering, risk analysis, safety, and fluid dynamics in Texas, Louisiana, and Mississippi. In 2010, testified as an expert witness on subsea blowout preventer systems before the U.S. House of Representatives Committee on Science and Technology. Expert reviewer of Federal papers on the BP/Macondo Incident.