

Ex. IV-1

Danny Walzel, P.E.

Well Control Specialist / Engineer

Educational Background

Bachelor of Science - Petroleum Engineering
Texas A&M University, College Station, TX 2002

Bachelor of Arts - Interdisciplinary Studies Physics/Math
Austin College, Sherman, TX 2002

State of Texas Registered Professional Engineer
Number – 100574

Member of Society of Petroleum Engineers and American Association of Drilling Engineers

Industry Training & Certifications

- MI/Swaco Water and Oil Based Drilling Fluids School
- IADC/WellSharp Certified
- Boots & Coots Reactive Pill School
- Basic Offshore Safety Induction & Emergency Training (BOSIET)
- BP/Chevron HPHT Drilling & Completion
- Wood Group – API Wellhead Equipment Technical Service Training
- Halliburton DEAL: Directional Drilling
- Halliburton DEAL: Rotary Steerable Products
- Halliburton DEAL: WELLPLAN
- Halliburton DEAL: Casing Design

Relevant Work Experience

2002 to Present | Boots & Coots Services – Houston, Texas
Well Control Specialist / Engineer

2000 to 2002 | Sperry–Sun Drilling Services

Highlights of Well Control Experience

2018 Santander, Columbia: Well Control Engineer responding to well which broached to surface in multiple locations. Utilized snubbing unit to remove corroded tubulars from wellbore. Advised customer throughout operations to secure wellbore.

2017 Red River Parish, Louisiana: Responded to gas well blowout due to failure in multibowl wellhead. Installed well head support system and dynamically killed well with coiled tubing.

2016 Lake Maracaibo, Venezuela: Installed a modified surface BOP stack on well at the lake bed to secure the well after a blowout.

2015 Aliso Canyon, California: Responded to a gas storage well blowout. Provided surface intervention while relief well was drilled.

Douglas, Wyoming: Member of well control team that responded to a 6 well pad where all 6 wells were on fire. All wells were killed and re-headed in 16 days

Offshore Qatar: Provided engineering support for an offshore well that experienced gas flow to surface. Section milled casing strings and set cement plugs.



- 2013 Baku, Azerbaijan: Responded to well fire offshore flowing at an estimated rate of 200 MMScf/day. Capped and diverted well.
- 2012 Offshore Miri, Malaysia: Provided well control consulting to client while drilling HPHT exploration well.
- Roger Mills County, OK: Responded to well fire that occurred at a depth of 800 ft. Removed rig and successfully killed well.
- 2011 Anaco, VZ: Well Control Engineer responding to a well which had broached to surface after being shut in on surface casing. Responsibilities included running and evaluating diagnostic logs which identified gas flow from multiple zones. Designed kill and plugging procedure.
- Jewett, Texas: Responded to well that experienced a casing failure after being shut in, which subsequently bridged off around the BHA. After the well bridged the drillpipe was blown out of the hole. Excavated down 50 feet to expose competent pipe; re-headed well back to surface; the well was successfully drilled to total depth.
- 2010 Shreveport, LA: Responded to a well that experienced parted casing, at 2,300 feet while cementing 5-1/2" production casing. Well had a shut in pressure of 2,600 psi. Froze 5-1/2" casing, removed cementing head, and installed a wellhead on 5-1/2" casing. Rigged up snubbing unit and ran in the hole with tubing, isolated part, and killed well.
- Unitah County, UT: Responded to blow out on a well that experienced a tubing failure. Removed wellhead, killed well, excavated around well to expose competent pipe, and re-headed well.
- 2009 Niger River Delta: Responded to multiple well fires which were set ablaze by oil thieves. Successfully capped and killed wells.
- Spurger, Texas: Responded to well control situation where the drillstring had been blown out of the hole. The drill bit and wear bushing were lodged in the BOP stack, and the well had a shut in pressure of 6,500 psi. Recovered bit and wear bushing from BOP stack, rigged up a snubbing unit, and snubbed in the hole with 4" drillpipe and killed well.
- 2008 Tsiengu Field, Gabon: Responded to a surface blowout in a remote rainforest region of Gabon that was making 30MM scfd gas and 10M bpd water. Removed rig from well, pulled drillstring from the hole, and dynamically killed the well.
- Al Jariya Field, Oman: Responded to an HPHT underground blowout. Supervised well control and snubbing operations to kill and abandon well.
- 2007 Deeplake, Louisiana: Killed underground flow on HPHT well. Supervised drilling operations, where kick and trip margins were negligible, and successfully drilled well to TD using OBM.
- 2006 Ogoni, Nigeria: Capped well on fire. Designed and implemented kill.
- Wabo, Papua New Guinea: Responded to a pressure control situation on a well in a remote rain forest location that experienced loss circulation and a complete evacuation of drilling fluids from the wellbore. Designed and implemented an unconventional diesel oil bentonite pill to kill the well.
- 2005 Anaco, Venezuela: Drilled a relief well to kill a cratered blowout well. Supervised well intercept and kill



Intisar Field, Libya: Responded to a pressure control situation. Killed well by picking up the BOP's and hot tapping the tubing. Designed and implemented kill.

Woodville, Texas: Responded to a pressure control situation where well was shut in on a 5,000 psi annular with 8,000 psi on the well. Designed and implemented off bottom kill.

Okarche, Oklahoma: Controlled and underground blowout that had numerous broaches to surface, some as far as 15 miles from well.

Caspian Sea: Provided well control consulting to client drilling in the prolific Kashagan East reservoir. Recommended reactive pill recipes and pumping procedures to regain circulation.

2004 Afam, Nigeria: Capped and killed blowout well that was set ablaze by oil thieves.

Donaldsonville, Louisiana: Controlled underground blowout on a salt cavern storage well.

2003 Southern Iraq: Worked to extinguish and kill wells set ablaze during operation Iraqi Freedom. Coordinated with customer during workover operations to return damaged wells to pre-war conditions

Caspian Sea, Kazakhstan: Provided well control consulting to customer. Also prescribed reactive gunk recipes to customer (DOBC) and supervised the pumping of gunk jobs.

2002 Crossville, Tennessee: Advised the EPA in engineering techniques to establish if a well that blew out, was the continuing source of pollution in a nearby river.



Ex. IV-2

Arash Haghshenas

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Well Control Engineer

Dr. Arash Haghshenas is the well control engineer for Boots & Coots – A Halliburton Service. He is responsible for supporting and developing engineering programs for well control incidents. Dr. Haghshenas joined Boots & Coots' well control engineering team in 2010. His experience includes relief well and dynamic kill operations, multiphase flow modeling in the wellbore, and well control training. Dr. Haghshenas holds a BSc. from the Petroleum University of Technology, an MSc. From University of Louisiana at Lafayette, and obtained his PhD from Texas A&M University. He is a member of IADC, AADE, SPE, Pi Epsilon Tau, and is on the editorial board for the Journal of Natural Gas Science and Engineering. Dr. Haghshenas has authored, co-authored and collaborated on several books and technical papers, most notably the Managed Pressure Drilling Book and IADC Drilling Manual.

Educational Background

- Texas A&M University, Petroleum Engineering, PhD, 2013
- University of Louisiana at Lafayette, Petroleum Engineering, MS, 2006
- Petroleum University of Technology, Iran, Petroleum Engineering, BS, 2002

Relevant Work Experience

2010 to Present | Boots & Coots – A Halliburton Services – Houston, Texas

Skills

- Professional user of Drillbench for analyzing well control scenarios, blowout condition, and relief well design and operation
- Professional User of Landmark suit of StressCheck, WellPlan, and DrillingXpert
- Entry Level User of Landmark suit of Compass, and WellCAT
- Developing codes and programs for specific applications
- IADC Well Control Instructor

Highlights of Well Control Experience

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| 2020 | Congo – Relief well operation and flood kill design for an offshore blowout in shallow water. |
| 2019 | Indonesia – Relief well operation and dynamic kill design for an offshore blowout in shallow water. The dynamic kill program included well control contingency provisions and cementing for the P&A operation. |
| 2019 | Houston, TX – Evaluating safe operational limits of formation fluid testing, with respect to well control consideration, to maximize the number of tests and volumes.

The simulation includes well control conditions and well flow dynamics to determine appropriate tools and test configuration |
| 2019 | Houston, TX – Developed a comprehensive well control contingency plan for an exploratory well in South America. The plan included well control, blowout, and gas dispersion modeling for the specific location |
| 2018 | Dubai, UAE – Developed and instructed a comprehensive well control and emergency response workshop for major oil companies |
| 2018 | Houston, TX – Developed a dynamic kill program for an extended reach well located in an environmentally sensitive location in Alaska. |
| 2018 | Houston, TX – Well control review and relief well planning for wells with high concentration of H ₂ S located in the southern part of Iraq. |



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Well Control Engineer

- 2018 Houston, TX – Relief well and dynamic kill planning for an ultra-Deepwater exploratory well in the Mediterranean Sea.
- 2017 Houston, TX – Consulting and simulating soft shut-in procedure and pressure buildup for offshore capping stack and well containment
- 2017 Houston, TX – Consulted for modeling and testing various software packages for real-time monitoring and well control modeling
- 2017 Houston, TX – Consulted a blowout response, intervention, and spill management drill for scenario in the GoM
- 2016 Porter Ranch, CA – Consulted for drilling a relief well and performing dynamic kill operation in a gas storage facility. The project included plugging the lower section of the blowing well to preserve the well for investigations and roots-cause analysis.
- 2016 South East Asia and South America – Consulted projects on dynamic kill analysis and contingency planning
- 2015 Douglas, WY – Participated in firefighting response to fires on a 6-well-pad blowout
- 2014 Houston, TX- Developed a methodology for analyzing sediment plugs as pressure barrier in the wellbore
- 2014 Houma, LA- Responded to a well control situation in HTHP well caused by a kick while tripping out of well after pumping a balanced cement plug
- 2013 South East Asia- Consulted projects on dynamic kill analysis and contingency planning
- 2013 Delhi, LA- Responded to multiple shallow gas blowout and craters with high CO₂ level. The operational response included combination of source control, well intervention, drilling relief wells with workover and hydraulic workover units
- 2013 Wyoming, PA- Responded to blowout after 21 stages of hydraulic fracturing. The was capped and safely secured
- 2012 Tilden, TX- Well control operation for an underground blowout of H₂S and CO₂ in an exhaust gas injection field
- 2012 Houston, TX- Developing a statistical and pseudo transient models for well control applications, risk analysis, and equipment selection, and plugging and abandonment
- 2010-2013 Houston, TX- Performing dynamic kill simulation for developing fields in Azerbaijan

Publications

Books and Manuals

Rehm, B., Haghshenas, A. Al-Yami, A., Hughes, J., Schubert, J. *Underbalanced Drilling: Limits and Extremes*. Houston: Gulf Publishing Company, 2012. Print ISBN: 978-1-933762-05-0

Rehm, B., Schubert, J., Haghshenas, A., Paknejad, A., Hughes, J. *Managed pressure drilling*. Houston: Gulf Publishing Company, 2008. Print ISBN 978-1-933762-24-1

IADC Drilling Manual: Well Control Equipment and Procedures. International Association of Drilling Contractors, 2015. Print ISBN 978-8-9915095-0-8

Peer-Reviewed



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Well Control Engineer

Jablonowski, C., Haghshenas, A., Shumilak, E., Tyler, K. "Specification of a Coupled Geological and Wellbore Fluid Dynamics Model for Uncertainty Analysis and Risk-Based Design on a Subsea Oil Project," *Natural Resources Research*, 26 (1): 57-65. 2017. DOI: 10.1007/s11053-016-9304-5

Conference Papers

Haghshenas, A. 2019. Well Control and Integrity Considerations for Development of Unconventional Resources. Paper SPE 194878-MS. Presented at SPE Middle East Oil and Gas Show and Conference. Bahrain. March 18–21

Haghshenas, A., Cuthbert, A.J., and Portillo, L. 2017. Blowout Control Challenges of Pad Drilling and Production: A Case History with Lessons Learned. Paper SPE 184656-MS. Presented at SPE/IADC Drilling Conference and Exhibition. The Hague, The Netherlands. March 14–16

Haghshenas, A., Hess, J., and Cuthbert, A.J. 2017, Stress Analysis of Tubular Failures During Hydraulic Fracturing: Cases and Lessons Learned. Paper SPE 184821-MS. Presented at SPE Hydraulic Fracturing Technology Conference. The Woodlands, TX. January 24–26

Haghshenas, A. and Andrew John Cuthbert. 2015. Probabilistic Bullheading Analysis is a Unique Risk Assessment Tool for Drilling and Completion Equipment Selection for Critical HTHP Wells. Paper SPE 174728-MS presented at Annual Technical Conference and Exhibition. Houston, TX, USA. 28-30 September

Jablonowski, C., Shumilak, E., Tyler, K., Haghshenas, A. 2014. Probabilistic Analysis of Geological Properties to Support Equipment Selection for a Deepwater Subsea Project. *Proceedings of the Probabilistic Safety Assessment and Management Conference*, Honolulu, HI, USA, 22-27 June.

Amirsaman Paknejad, J. Schubert and A. Haghshenas. 2007. A New and Simplified Method for Determination of Conductor Surface Casing Setting Depths in Shallow Marine Sediments (SMS). Paper AADE 07-NTCE-41 presented at National Technical Conference and exhibition Houston TX. April 10-12

Arash Haghshenas, J. Schubert, A. Paknejad and B. Rehm. 2007. Pressure Transient Lag Time Analysis During Aerated Mud Drilling. Paper AADE 07-NTCE-40 presented at National Technical Conference and exhibition Houston TX. April 10-12

Reviews and Contributions

Skinner, L. *Hydraulic Rig Technology and Operations*. Gulf Professional Publishing, 2019. ISBN 978-9-12-817352-7

Skinner, L. *Coiled Tubing Operations*. . International Association of Drilling Contractors, 2016

Haghshenas, A., Zhang, H., and Wood, D. 2015 "Special Issue: "Smart Drilling and Completion to Optimize Gas and Gas Liquids Production" *Journal of Natural Gas Science and Engineering*

Robinson, L., Garcia, Juan A. *Drillers Knowledge Book*. International Association of Drilling Contractors, 2015. Print ISBN 978-0-9909049-8-4

Myers, G. Cutting Costs Down Deep, *Oilfield Technology Magazine*. Vol. 02, Issue 03, April 2009, Pages 23-27

