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**NOVEMBER 27-28, 2018**

George R. Brown Convention Center • Houston, TX



November 28, 2018 | 10:30am

## Smart Drilling & Smart Rigs Panel Discussion

Sponsored by:  
Bastion Technologies Inc.  
Jorge Hernandez



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# Bastion's Engineering Heritage

- 20 years of Rocket Engine Design, Analysis, and Testing
- Launch Vehicle/War Fighter Systems
  - Hellfire, Stinger, Javelin, TOW, JAGM, APKWS Single Kill Weapon, Mars Curiosity, InSight, Mars 2020, SLS SRM



# Engineering Safety & Mission Assurance into Oil & Gas Systems

- Integrated System Level (Project level)
  - Probabilistic Risk Assessment
  - Decision Analysis
- Subsystem Level (Component level)
  - Fault Tree Analysis
  - Hazard Analysis
  - Failure Modes and Effects Analysis



# Case Study 1: Drill Ship/Vessel Assurance Process (Integrated System Level)

## BP Vessel Assurance Issue:

- Rigs and Drill ships hired were not properly fit for service and were not adequately station keeping though vessel and equipment specifications individually met requirements
- Bastion contracted to:
  - Develop a Systems-level vessel qualification analysis that comprehensively integrates the Vessel, the Equipment, and the Operational procedures

## Result – Improved Safety and Significant Cost Savings:

- Recognized by BP for exceptional analysis development. Analysis now part of BP Vessel Procurement and Qualification process (over 20 vessels completed to date).



BP Thunderhorse



Ross Candies



Seabed Supporter



Olympic Challenger

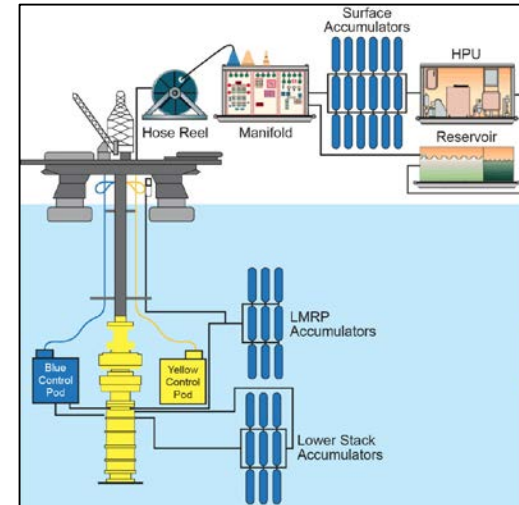
		Likelihood of Risk Event							
		1	2	3	4	5	6	7	8
Severity Level	Criticality								
	Facilities								
A	5	9	10	11	12	13	14	15	16
B	3	5	6	7	8	9	10	11	12
C	1	2	3	4	5	6	7	8	9
D	5	6	7	8	9	10	11	12	13
E	4	5	6	7	8	9	10	11	12
F	3	4	5	6	7	8	9	10	11
G	2	3	4	5	6	7	8	9	10
H	1	2	3	4	5	6	7	8	9
Frequency									
Probability									

Criticality Matrix (8x8) per customer



# Case Study 2: SureShear Project – instant hydraulic pressure for critical applications

- Safety critical systems in a drilling stack are powered by hydraulic pressure
  - Casing Shear Rams
  - Blind Shear Rams
  - Annular Rams
- Subsea hydraulic pressure systems rely on compressed gas cylinders (accumulators) continuously pressurized from the surface

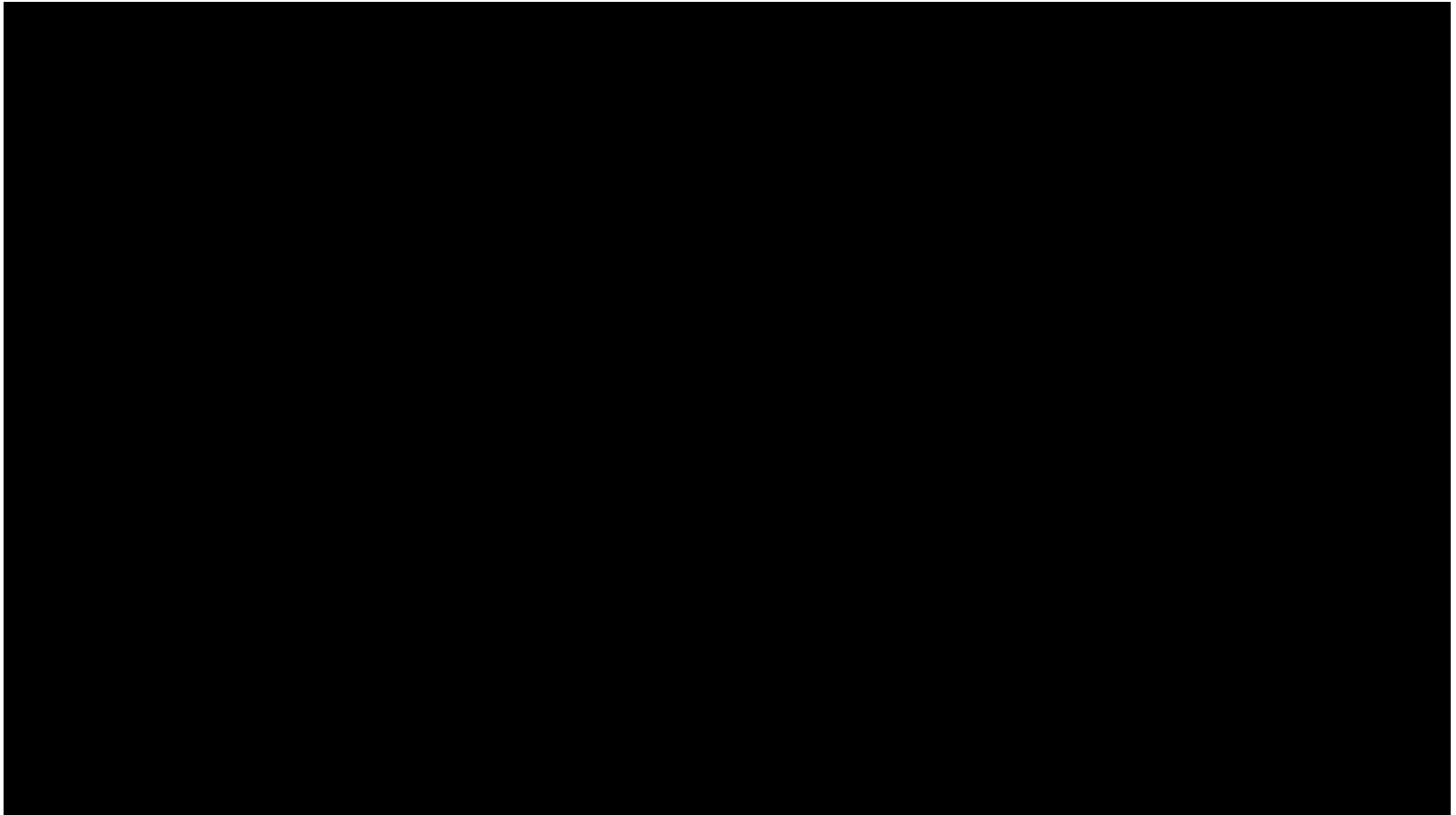


# Case Study 2: SureShear Project (continued)

- Pioneering the use of integrated SMA engineering and proven Military/Aerospace gas generator technology for oil exploration
- SureShear is an on-demand & self-contained hydraulic pressure generator
  - Burns solid propellant to generate pressurized gas (just like in automotive air bags) which is used in various emergency applications
  - Patent US 9,212,103 issued Dec 2015
- **Nearly 10X Increased Performance/Decreased Weight and Footprint vs Conventional Compressed Gas Systems**



# Case Study 2: SureShear Project (continued)







**QUESTIONS?**

**THANK YOU**

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