



International  
Association  
of Oil & Gas  
Producers

# Introduction into IOGP's Wells Expert Committee (WEC)

Diana Khatun

IWCF Well Control Workshop

22<sup>nd</sup> November 2023



# About IOGP



We are the global  
voice of our  
industry



We bring  
the industry  
together



We drive good  
practices



We serve  
stakeholders  
around the globe  
as go-to experts

# We speak on behalf of a global membership

IOGP has 93 Members (as of November 2023)

## Companies



## Associations



## Associate Members



# The areas we are working on

- **Technical**

- We work to develop and disseminate best practice in safety, environment, engineering.
- This includes, among others, health, geomatics, metocean, decommissioning and well control.

- **Advocacy**

- From our London, Brussels and Houston offices, we address a variety of stakeholders global and regional bodies as well as the broader public.



Engineering



Environment



Safety



Europe



Americas



Communications

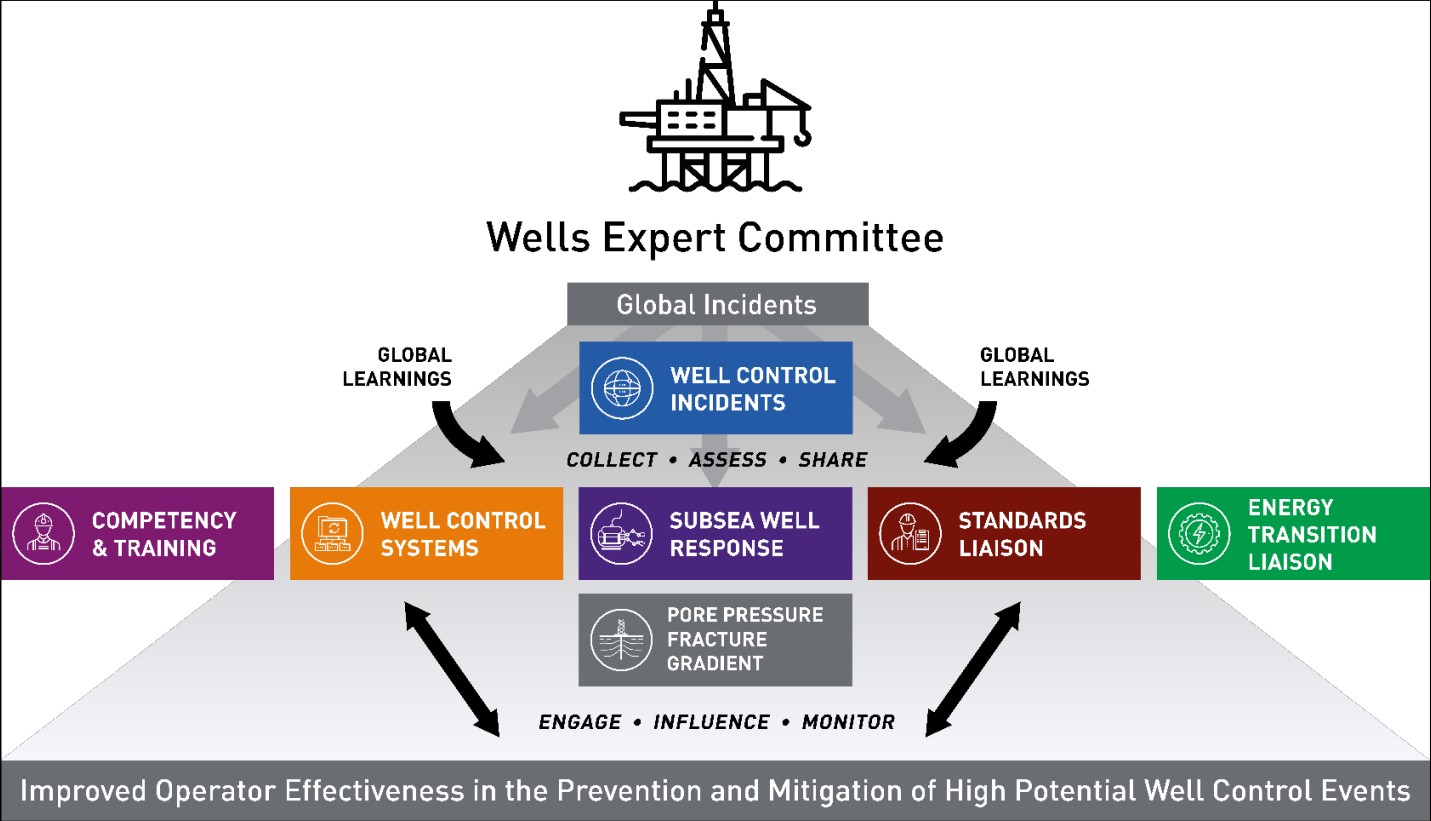
# Global Industry Response Group (GIRG)

- In 2010, IOGP established a Global Industry Response Group (GIRG) to ensure that the lessons learned from that year's deep water Gulf of Mexico incident and other similar well control event were widely absorbed and applied.
- The GIRG worked closely with international oil companies, national oil industry associations, regulators and other government agencies to improve the safety and sustainability of deep water operations around the world.



# Wells Expert Committee (WEC)

The purpose of the Wells Expert Committee (WEC) is to improve well Operators' effectiveness in the prevention and mitigation of high consequence well control events throughout the well life cycle, but particularly during well construction and well work, recognizing that such events pose the highest global risk to safety, to the environment, and to the industry's license to operate



# WEC Leadership



## Wells Expert Committee



**CHAIR:**  
Paul Forman  
(bp)



**VICE-CHAIR:**  
Alexandre Depiesse  
(TotalEnergies)



## WELL CONTROL INCIDENTS



**CHAIR:**  
Andrew Parkinson  
(Shell)

**VICE-CHAIR:**  
Dean Terrien  
(CNOOC)



## WELL CONTROL SYSTEMS



**CHAIR:**  
Matthew Tenny  
(ExxonMobil)

**VICE-CHAIR:**  
Gabriel da Silva Felipe  
(Petrobras)



## STANDARDS LIAISON



**CHAIR:**  
Jonathan Harker  
(bp)



## PORE PRESSURE FRACTURE GRADIENT



**CHAIR:**  
Fernando Ziegler  
(Chevron)

**VICE-CHAIR:**  
Kun Su  
(TotalEnergies)



## COMPETENCY & TRAINING



**CHAIR:**  
David Lobell  
(bp)



## SUBSEA WELL RESPONSE



**CHAIR:**  
Mauricio Baez  
(TotalEnergies)

**VICE-CHAIR:**  
Andrés Cruz Vélez  
(ExxonMobil)



## ENERGY TRANSITION LIAISON



**CHAIR:**  
Jim Powers  
(Chevron)

# Well Control Incidents Subcommittee

The purpose of the Well Control Incidents Subcommittee is to collect, assess and share global well control incidents and learnings of continuously improving quality from IOGP members in order to prevent reoccurrence of such events.





# Well Control Incidents Subcommittee – The Process



# Well Control Incidents Subcommittee



International Association of Oil & Gas Producers

REPORT 637R AUGUST 2021

RESTRICTED - FOR IOGP MEMBERS ONLY

## Review of Well Control Incidents



### WELL CONTROL INCIDENT LESSON SHARING

Flow observed from the annulus 2 hours after the completion of a 13 3/8" casing cementing operation. The flow noted has been deemed a controlled well control event.

After completing a 13 3/8" casing cementing operation (WOW) to lay down the cement head post cement still connected, flow from the annulus side was observed. The initial flow observed was of the cement was in place. The initial flow observed tank. After 2 hours, and observing flow in excess well was shut in on the upper annular BOP with the

**IOGP Wells Expert Committee/Well Control Incident description contains sufficient lessons further encourage the recipients of this mail to organization.**

After completing cementing operations on the 13" the cement head post cement job with the casing from the annulus side was observed starting 45 n overall increase in trip tank of 2.1bb/hr. After 2 h predicted thermal expansion values, the well was was 1140 psi on the Drillpipe running string and 1.

Over the course of 2 days a series of controlled d the casing and annular side. It was concluded th the on the annulus side was not due to thermal expan had most likely entered the wellbore and we had s surface. Attempts were made to bullhead the sus However, injection pressure was limited by the p casing. Following a risk assessment, and recogni a low rate, it was agreed to open the BOP, releas landing string, and then run in with the casing see the 13 5/8" x 22" annulus by setting this seal ass success and the incident closed.

### WELL CONTROL INCIDENT LESSON SHARING

#### Gas flow while setting tubing ha wellhead

A gas producer well was being prepared for temporary abandonment. temporary abandonment plug no flow from the tubing and annulus was mas tree was nipped down and the tubing hanger lifted to replace the the flange type tubing hanger was replaced with a mandrel tubing han installation. When lowering the tubing hanger into the wellhead, the tu 2ft above the wellhead. A rig site decision was made to unset the co enable landing of the tubing hanger. Gas flow occurred while attempti hanger. Flow was diverted through the casing valve while they continu hanger followed by nipping up the BOP. The well was then successfu ram preventer for kill operations. The well was killed by bullheading th annulus.

Observation prior to execution of a temporary plug abandonment job the tubing and annulus. The activity continued with nipping down the X the tubing to replace the flange type tubing hanger with a mandrel one installation. When lowering the mandrel tubing hanger into the wellhea stopped at 2 ft above the wellhead. The decision was made at the rig' completion packer in the well to be able to lower the tubing and set th flow was observed while attempting to set tubing hanger in the wellhead. From was observed through the casing valve while continuing to set the tubing hanger followed by nipping up the blow out preventer. The well was successfully shut-in on the pipe ram preventer for the killing operation.

The well was killed by bullheading formation fluid down the tubing and annulus.

#### What Went Wrong?:

Inconsistency of approved well program execution:

- Hydrostatic barrier prior to x-mas tree removal was not established – decision was based on accepted practice from previous well execution.
- The risk of unsetting packer was not communicated and addressed.
- Well control risks of well program deviation (i.e. unsetting completion packer and not establishing hydrostatic pressure barrier) were not recognized nor followed with Risk Assessment (RA) and Management Of Change (MOC) process.

### WELL CONTROL INCIDENT LESSON SHARING

#### Kick on subsea well following upper loss zone results in bullhead and sidetrack

Fracture gradient and formation integrity is critical in every well, particularly an exploration well, as offset data may be limited to non-existent. With pressure predictions, well monitoring and casing design over-pressured zones to weaker formations are isolated as well construction continues toward total depth.

The following incident describes a scenario where weaker zones, uncovered below the formation integrity test, can affect the ability to maintain formation integrity. The event describes how losses were balanced cement plugs until full returns were established drilling rate alone, before continuing ahead.

The incident description helps detail the importance pore pressure as the team attempted to circulate ou resulted in the decision to bullhead, plug and sidetrack.

Whilst drilling 12 1/4" phase of subsea exploration w Well shut in and kick started to be circulated out wit After heavy mud circulation completed still observe Continued well control, increased mud weight furthe weight method. Observed lost return while performi mud. Pumped barite pill followed by cement plug in bull performed side track.

#### What Went Wrong?:

- Loss zone encountered before kick event and
- Cement plugs not properly effective.
- Cured loss zone tested only by drilling circula
- LOT test not repeated after remedial job.
- Well section fracture gradient derating not co

#### Corrective Actions and Reco

### WELL CONTROL INCIDENT LESSON SHARING

#### Well Control Incident with Complications While Attempting to Cure Total Losses

A well control incident took place while preparing to sever the drill string above the plugged BHA.

The well had experienced total losses, conventional LCM pills were unsuccessful, resulting in the decision to pump a "total loss" LCM pill. Pill was under displaced, and BHA was not stripped above pill for fear of damaging the MPD annular. BHA became plugged.

While preparing to sever pipe, the well flowed and was shut in. Bullheading was attempted but failed as pressure was kept low for hole integrity concerns. Pipe was severed above BHA, but circulation was still not possible. Additional LCM pills were pumped, followed by cement. Circulation regained. During Drillers Method circulation, high gas readings and oil contaminated mud seen and shakers. Circulation was stopped. No returns when attempting to restart circulation. Decision made to bullhead without concern for open hole. Well killed and cement plugs pumped. Open hole abandoned.

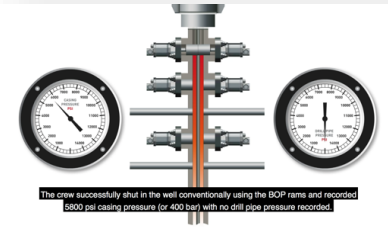
**IOGP Wells Expert Committee/Well Control Incident Subcommittee believes that this incident description contains sufficient lessons to be shared with the industry. We further encourage the recipients of this mail to share it further within their organization.**

Drilling 8 1/2" reservoir section using Managed Pressure Drilling, with hydrostatically underbalanced mud. Water zone with high pressure exposed in start of the section, oil reservoir with slightly lower pressure exposed further down. Two severe loss incidents experienced while drilling, reducing the drilling window to 0.3 ppg.

Close to planned TD of the well, third severe loss zone encountered. LCM treatment unsuccessful. Decided to pump "total loss" LCM pill; underdisplaced pill and left BHA on bottom due to concerns with provoking a leak in MPD annular if stripping above the pill. Attempted circulation and observed string plugged. Mobilized severing equipment, meanwhile decided to shut in well to stabilize losses and preserve mud; closing the BOP removed the MPD back pressure, reducing the bottom hole pressure. Loss rate decreasing and levelling out while waiting for equipment.

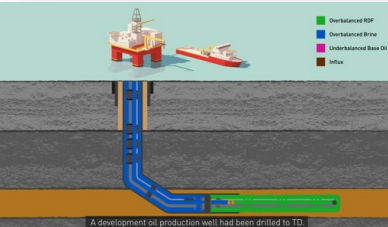
While preparing to sever string above BHA, observed gain and shut in well again. Attempted cautious bullheading, limited by integrity of previous loss zone, unsuccessful. Severed string above BHA and attempted Driller's method, unable to establish returns.

Pumped LCM and cement and achieved formation integrity for circulating. 2nd attempt of Driller's method stopped due to early arrival of high gas readings at shakers, and heavily oil-



The crew successfully shut in the well conventionally using the BOP rams and recorded 5800 psi casing pressure (or 400 bar) with no drill pipe pressure recorded.

### WCI Alert 16-1 video



### WCI Alert 16-2 video



### WCI Alert 21-4 video

# Well Competency & Training Subcommittee

The purpose of the Competency and Training Subcommittee is to minimize the impact of global well control events due to operations-related human error.

This involves providing individuals and operations teams in our industry the leadership and guidance to assure development and verification of technical and non-technical competency, including human behaviours.



# Well Competency & Training Subcommittee

International Association of Oil & Gas Producers  
 issue 476 | APRIL 2023

Recommendations for enhancements to well control training, examination and certification

International Association of Oil & Gas Producers  
 issue 501 | APRIL 2020

Crew Resource Management for Well Operations teams

International Association of Oil & Gas Producers  
 issue 502 | DECEMBER 2014

Guidelines for implementing Well Operations Crew Resource Management training

International Association of Oil & Gas Producers  
 issue 646 | OCTOBER 2022

Hybrid learning solutions for well control courses

Weak Signals video

International Association of Oil & Gas Producers  
 issue 656 | FEBRUARY 2023

Assessment of eye tracking technology in well control operations

International Association of Oil & Gas Producers  
 issue 668 | AUGUST 2023

Gamification techniques in well control training and competency

International Association of Oil & Gas Producers  
 issue 585 | JUNE 2021

Managing the introduction of new technology in well operations

The continual introduction of new technology within the wells sector has created the ability to 'modern' increasingly complex and challenging operations safely and more efficiently. However, introducing new technology into existing well operations, systems and processes presents full management challenges.

International Association of Oil & Gas Producers  
 issue 585 | JUNE 2021

Key factors for training and competency in Managed Pressure Drilling (MPD) operations

**Introduction**  
 The demand for high-pressure drilling with the addition of drilling services has accelerated the necessity to drill these challenging and complex wells. The challenges are primarily addressed by the process and human product parameters, specifically the process parameters (pressure, temperature, flow rate, etc.) and the human factors (operator skills, decision-making, etc.) in a complex task. The latter is the focus of this paper, which aims to provide a structured approach to the training and competency requirements for MPD operations.

Human factors are the human elements that influence the performance of a task. In the context of MPD, human factors refer to the ability of the operator to understand the well conditions, make decisions, and execute the drilling process safely and efficiently. The operator of Managed Pressure Drilling (MPD) technology is currently one of the most difficult roles to train for, as it requires a high level of technical knowledge and a deep understanding of the well conditions, the drilling process, and the human factors involved. The training and competency requirements for MPD operations are therefore a complex and multi-faceted challenge.

This paper discusses the key factors for training and competency in MPD operations, including the importance of human factors, the role of the operator, and the need for a structured approach to training and competency development.

Human Factors videos

# Well Control Systems Subcommittee

The purpose of the Well Control Control Subcommittee is to assist industry in the prevention of high consequence well control events, recognizing that such events pose the highest societal risk on a drilling or work over rig.




# Well Control Systems Subcommittee

 International Association of Oil & Gas Producers

POSITION PAPER | DECEMBER 2022

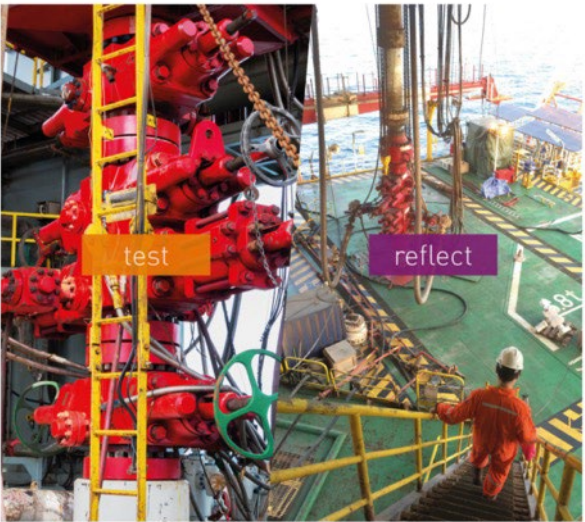
## Well Control Systems - Managed Pressure Drilling (MPD) Recommendations



 International Association of Oil & Gas Producers

REPORT 625 | AUGUST 2021

## Prevention of Subsea BOP Control Tubing, Hoses, and Fittings Failures



test reflect

 SHEAR TEST DATABASE  
JOINT INDUSTRY PROJECT



Home Mission Members Resources Examples

## RAPID-S53

Reliability and Performance Information Database for the Well Control Equipment (WCE) covered under API S53.

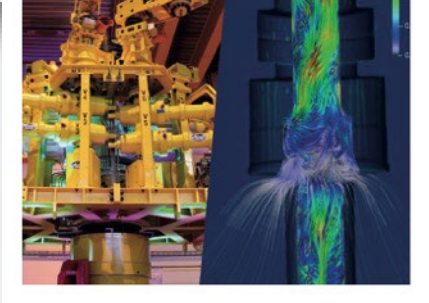
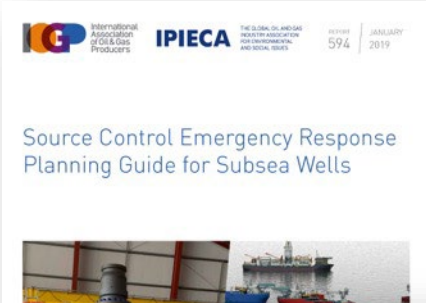
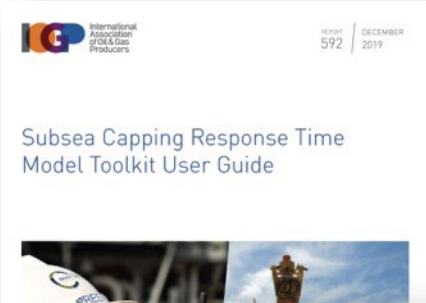


# Subsea Well Response & Source Control Subcommittee

The purpose of the Subsea Well Response & Source Control Subcommittee is to support the industry in planning and use of subsea well response and source control equipment and associated activities and services, centred around risk based and balanced approaches.



# Subsea Well Response & Source Control – Resources





# Well Standards Liasion

The purpose of the Well Standards Liasion is to monitors the development of critical well control and well integrity standards that can be utilized to prevent high consequence well control and/or well integrity incidents.



# Well Standards Liasion



REPORT 485 SEPTEMBER 2023

## Standards and guidelines for well integrity and well control

### Introduction

This reference list includes guidelines, standards and other documents, produced by both IOGP and other organizations, which influence practice, equipment selection and equipment specification related to maintaining well control and well integrity. IOGP recognizes that different users will use listed references in different ways. To that end, this list has been prepared from the viewpoint of leading Operating Companies. IOGP recognizes that in recent times API and ISO have agreed to de-brand joint publications. IOGP does not advocate a preference for one over the other, but for simplicity has retained the document numbers of both institutions but left the document name to that of ISO.

The standards development process can result in a delay to the update of related standards, such as an ISO standard based on an API Specification, and users of this report must satisfy themselves as to the appropriate version to use.

This report is provided for guidance only, and users must not rely upon it as a complete listing of requirements and guidance relating to well control and well integrity.



- ANSI** - American National Standards Institute
- API** - American Petroleum Institute
- BSEE** - Bureau of Safety and Environmental Enforcement
- IE** - Energy Institute
- IOA** - International Association of Drilling Contractors
- ISOWSA** - Industry Steering Committee on Wellbore Survey Accuracy
- ISO** - International Standards Organization
- ISO/IEC** - International Electrotechnical Commission
- NORSOK** - Norwegian Standards
- ON** - Offshore Norge (formerly Norwegian Oil and Gas Association, NOG)
- OGUK** - Offshore Energy UK (formerly Oil & Gas UK)

Standards and guidelines for well integrity and well control

Number	Well Equipment Specification & Manufacturing
API RP 92.5	Pipe With-Thread Connections
API SPEC 142	Lock, Mandrel and Landing Nipples
API SPEC 154C	Completion Accessories
API SPEC 197T	Downhole Well Test Tools and Related Equipment
API SPEC 19V	Subsurface Completion Isolation (Shut-in) Valves and Related Equipment
API SPEC 55T	Cased Tubing with Casing and SI Units
IOGP JIP 33	Casing & Tubing (API) - Supplementary Spec to API Specification SCT
ISO 11622 or API SPEC 6A	Wellhead and Christmas Tree Equipment
ISO 15626-1 or API SPEC 15A	Cements and Materials for Well Cementing - Part 1: Specification

Number	Well Control Management & Contingency Planning
ISO 10426-2 or API RP 10B-2	Cements and Materials for Well Cementing - Part 2: Testing of Well Cements
ISO 10426-3 or API RP 10B-3	Cements and Materials for Well Cementing - Part 3: Testing of Deepwater Well Cement Formulations
ISO 10427-3 or API RP 10F	Equipment for Well Cementing - Part 3: Performance Testing of Cementing Fluid Equipment
ISO 15622 or API SPEC 14A	Downhole Equipment - Subsurface safety valve equipment
ISO 11950 or API SPEC SCT	Steel Pipes for Use as Casing or Tubing for Wells
ISO 15628-4 or API SPEC 17D	Design and Operation of Subsea Production Systems - Subsea Wellhead and Tree Equipment
ISO 13680 or API SPEC 509A	Corrosion-Resistant Alloy Seamless Tubular Products for Use as Casing, Tubing, Casing Stack and Accessory Material
ISO 14310 or API SPEC 1101	Downhole Equipment - Packers and Bridge Plugs
ISO 21818 or API SPEC 54L	Steel Pipe for Pipeline Transportation Systems
TH HILL DS-1 VOL.5 1-4	Drilling Submer Product Specification, Drill Stem Design and Operation, Drill Stem Inspection, Drilling Specialty Tools

Number	Well Control Management & Contingency Planning
API BULL 97	Well Construction Interface Document Guidelines (WCID)
API RP 49	Drilling and Well Servicing Operations Involving Hydrogen Sulfide
API RP 59	Well Control Operations
BSEE 2019-0962	Oil and Gas and Sulfur Operations in the Outer Continental Shelf-Blowout Preventer Systems and Well Control Sessions (Well Control) Rev 2019
IEP PART 17 VOL.2	Model Code of Safe Practice Controls During the Drilling of High Pressure, High-Tech Offshore Wells
IOGP-omega	Deepwater Well Control
IOGP REPORT 556	Guidance for computation dynamics in subsea well applications
IOGP REPORT 476	Recommendations for Well Control Training, E and Certification
IOGP REPORT 591	Guidance for Subsea Well Competency and Skills
IOGP REPORT 592	Subsea Capping Response Toolkit User Guide
IOGP REPORT 594	Source Control Emergency Planning Guide for Subsea
IOGP REPORT 628	Recommendations for Drilling to Well Control Drills in the Industry
IOGP REPORT 654	Assessment of eye tracking in well control operations
IOGP REPORT 660	Well Control Incident Drill Operations
IOGP REPORT 664	Well Life Cycle Integrity Guidelines
IOGP REPORT 668	Guidelines for High-Pressure, High-Temperature Wells
ISO TS 17619	Guidelines on Competency Management for Well Ops Personnel

Number	Well Control Management & Contingency Planning
ISO 15626-4 or API RP 10B-4	Cements and Materials for Well Cementing Part 4: Preparation and Testing of Formed Cement Slurries at Atmospheric Pressure

Number	Well Control Management & Contingency Planning
ISO 15626-5 or API RP 10B-5	Cements and Materials for Well Cementing Part 5: Determination of Shrinkage and Expansion of Well Cement Formulations at Atmospheric Pressure
ISO 15626-6 or API RP 10B-6	Cements and Materials for Well Cementing Part 6: Methods of Determining the Static Seal Strength of Cement Formulations

Number	Well Control Management & Contingency Planning
API RP 65.3	Wellbore Plugging and Abandonment
DEUK	Guidelines for the Abandonment of Wells
DEUK	Well Decommissioning Guidelines
DEUK	Well Decommissioning for CO <sub>2</sub> Storage
DEUK	Use of Barrier Materials in Well Decommissioning Guidelines

Number	Well Control Management & Contingency Planning
API RP 13A	Design and Operation of Subsea Production Systems - General Requirements and Recommendations
API RP 90	Annular Casing Pressure Management for Offshore Wells
API RP 90.2	Annular Casing Pressure Management for Offshore Wells

Number	Well Control Management & Contingency Planning
API RP 13B-1	Field Testing Water-Based Drilling Fluids
API RP 13B-2	Laboratory Testing of Drilling Fluids
API RP 13B-3	Field Testing Nonaqueous-Based Drilling Fluids
API RP 13B-4	Review of subsea well test capability
API RP 13B-5	Optimization techniques in training and competency
API RP 130	Rheology and hydraulics of Oil-well Drilling Fluids
API RP 13J	Testing of Heavy Brines
API RP 79	Tripping Operations in Hydraulically Destabilized Wells
API RP 90C	Managed Pressure Drilling Operations - Controlled Mud Level (CML)
API RP 10M	Managed Pressure Drilling Operations with Surface Back-pressure
API RP 10P	Managed Pressure Drilling Operations - Pressurized Mud Cap Drilling with a Subsea Blowout Preventer
API RP 90S	Managed Pressure Drilling Operations - Surface Back-pressure with a Subsea Blowout Preventer
API RP 90U	Underbalanced Drilling Operations
IOGP INFORMATION SHEET	Key factors for training and competency in Managed Pressure Drilling (MPD) operations
ISO 15626-4 or API RP 10B-4	Cements and Materials for Well Cementing Part 4: Preparation and Testing of Formed Cement Slurries at Atmospheric Pressure

Number	Well Control Management & Contingency Planning
API RP 13C	Well Control Equipment Reliability
API RP 78	Well Control Equipment Reliability
API SPEC 64P1	Well Control Equipment Reliability
API STD 45-2	Well Control Equipment Reliability
API STD 3039	Well Control Equipment Reliability

Number	Well Control Management & Contingency Planning
API RP 13D	Well Control Equipment Reliability
API RP 13E	Well Control Equipment Reliability
API RP 13F	Well Control Equipment Reliability
API RP 13G	Well Control Equipment Reliability
API RP 13H	Well Control Equipment Reliability
API RP 13I	Well Control Equipment Reliability
API RP 13J	Well Control Equipment Reliability
API RP 13K	Well Control Equipment Reliability
API RP 13L	Well Control Equipment Reliability
API RP 13M	Well Control Equipment Reliability
API RP 13N	Well Control Equipment Reliability
API RP 13O	Well Control Equipment Reliability
API RP 13P	Well Control Equipment Reliability
API RP 13Q	Well Control Equipment Reliability
API RP 13R	Well Control Equipment Reliability
API RP 13S	Well Control Equipment Reliability
API RP 13T	Well Control Equipment Reliability
API RP 13U	Well Control Equipment Reliability
API RP 13V	Well Control Equipment Reliability
API RP 13W	Well Control Equipment Reliability
API RP 13X	Well Control Equipment Reliability
API RP 13Y	Well Control Equipment Reliability
API RP 13Z	Well Control Equipment Reliability

# Pore Pressure Fracture Gradient Expert Group

The purpose of the Pore Pressure Fracture Gradient is to develop an industry guidance document to describe the Well Control Hazard (Hydrocarbons Under Pressure) and through that help harmonize approaches to this critical task in the Well Control bow tie.



# Pore Pressure Fracture Gradient Task Force

 **WELL CONTROL INCIDENT LESSON SHARING** 

[<<< Back to Results](#)

[Printable version](#)

## Misunderstood pore pressure, lack of vigilance and empowerment cause Well Control Incident.

Drilling 6" hole - just entering an identified reservoir - with 1.40SG mud weight (MW). The formation pressure expected was not well understood and a large uncertainty remained between a depleted reservoir scenario or a pressurized case (water injection on a mature field).

On the first stand into the reservoir, a circulation was performed in order to assess the gas level and the stability of the well, a maximum of 7% was observed. No flowcheck performed but a conclusion was made on a depleted scenario case. A drill pipe (DP) connection was then performed to continue drilling, 7m<sup>3</sup> of gain were taken during the connection without being noticed. Drilling was resumed for a few more metres and significant flow increase & gain in active system was observed.

Drilling was stopped but the well was not shut in immediately. It took 5 more minutes to investigate the anomaly.

Shut in drill pipe pressure (SIDP) 450psi - shut-in casing pressure (SICP) 1160psi - 25m<sup>3</sup> total estimated gain.

Significant gain volume generated serious difficulties to control the well.

Well was finally killed using driller's method with kill mud weight (KMW) 1.64SG.

### What Went Wrong?:

Misunderstanding of the pore pressure prediction (high uncertainty expected between 0.98 to 1.51SG).

Wrong pore pressure diagnosis while based on non-valid gas criteria - the gas% criteria was not a pump-off event.

No flowcheck performed and anticipated in the drilling strategy to enter that reservoir.

Lack of crew vigilance, poor well monitoring during DP connections - first kick during connection not identified.

Basic well control procedure not properly implemented for kick detection and well shut-in. Driller not empowered to shut the well in without authorization.

 **WELL CONTROL INCIDENT LESSON SHARING** 

[<<< Back to Results](#)

[Printable version](#)

## Subsurface uncertainties, unfamiliar technologies and shallow water flows in a subsea exploration well

*During the drilling of top-hole sections on a subsea exploration well, a series of water flows were encountered.*

*A number of lessons were identified relating to subsurface uncertainties, well planning, and the detection of well flow, whilst operating with a mud recovery system during riserless drilling operations:*

1) *The importance of understanding and planning for subsurface uncertainties in well operations.*

2) *Risks associated with the implementation of new technologies in well operations, including the management of risks with crew's knowledge, skills and ability.*

***The Wells Expert Committee/Well Control Incident Subcommittee believes that this incident description contains sufficient lessons to be shared with the industry. We further encourage the recipients of this mail to share it further within their organization.***

The top-hole section was drilled to TD with seawater and sweeps prior to displacing to 1.32sg (11ppg) mud. A shallow water flow was encountered during the trip-out but the well was killed using a number of heavy pills up to 1.60sg (13.3ppg). Due to concerns about the hole conditions the decision was taken to abandon the hole section and re-spud the well.

Drilling the drilling of the new top-hole section a similar mud weight of 1.32sg (11ppg) was used but with a revised plan for a shallower section depth. However, before the revised section depth was reached an unexpected flow was detected. It was necessary to increase mud weight first to 1.38sg (11.5ppg) and then to 1.47sg (12.2) prior to pulling out of the hole. A decision was then made to change the 28" liner casing depth.

Shortly after drilling out the liner with a 1.43sg (11.9ppg), a mud shallow water flows was encountered. Attempt to kill the well with a 1.51sg (12.6ppg) mud was unsuccessful. Eventually, the flow was controlled with 1.55sg (12.9ppg) mud but with slight losses occurring.



Title: Well integrity: Prevention of Well Control Incidents, the case for industry guidelines

### Problem Statement:

Much industry collective effort has gone into defining responses to deal with any loss of well control situation. Recent data and incidents provide a view that a deeper understanding of the underlying hazards and how industry designs for them is worthy of collective action. This will strengthen industry focus towards the Left Hand Side of the "Loss of Well Control" bow tie and thus reduce the likelihood of any loss of well control events taking place. The planned efforts can be split in three broad areas:

- 1) Well design "inputs" (pore pressure/fracture gradients/geological risks).
  - 2) translation of 1) into efficient and safe well designs
  - 3) definition of safe operating envelopes for Wells activities in the operations and production phases.
- It is recognized that -whilst some areas like pore pressure/fracture gradient prediction has no universally accepted industry guidelines- in other areas guidance does exist. As such, this effort will likely need some development of new guidance but also target implementation of existing guidance.

### The changes we expect to see:

- Systematic industry approach to pore pressure/fracture gradient prediction, likely through the development and adoption of new industry baseline guidance.
- Systematic work flows and key technical elements required for translating any new pore pressure/fracture gradient guideline into efficient and safe well designs, likely through development and implementation of new industry baseline guidance.
- Systematic implementation of existing relevant guidance on safe well operating envelopes.

### Industry Association(s) invited to lead the change / develop the solution:

- International Association of Oil and Gas Producers (IOGP) / International Association of Drilling Contractors (IADC)

### Key performance indicators:

- Development of industry wide standards or guidelines.
- IRF/IOGP collaboration on selection of targeted guidance for shared implementation focus.
- Reduced likelihood of well control incidents.

Contact: NOPSEMA (Australia)  
Endorsed by IRF Management Committee

Date: 05 July 2021



REPORT 608 | JULY 2022

Recommended practice for pore pressure and fracture gradient analysis for well design – construction, intervention, and abandonment



# WEC Deliverables 2023

## PUBLISHED DOCUMENTS



IOGP Report 476  
**Recommendations for enhancements to well control training, examination and certification**



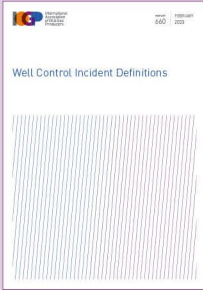
IOGP Report 485  
**Standards and guidelines for well integrity and well control**



IOGP Report 646ex  
**Hybrid learning solutions for well control courses – Executive Summary**



IOGP Report 656  
**Assessment of eye tracking technology in well control operations**



IOGP Report 660  
**Well Control Incident Definitions**



IOGP Report 668  
**Gamification techniques in well control training and competency**

## WORKSHOPS

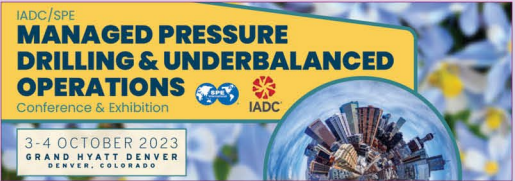


**Offshore Oil & Gas Environment and Safety Workshop**  
 14-16 June 2023, Suriname

## CONFERENCES



**IADC Well Control Conference of the Americas & Exhibition**  
 22-23 August 2023, New Orleans



**IADC/SPE Managed Pressure Drilling & Underbalanced Operations Conference & Exhibition**  
 3-4 October 2023, Denver



**IWCF Annual General Meeting & Well Control Workshop**  
 22-23 November 2023, Azerbaijan

## WCI ALERTS



10 Published Alerts

# Key Takeaways

## Wells Expert Committee (WEC)

- WELL CONTROL INCIDENTS** (Blue box with globe icon)
- COMPETENCY & TRAINING** (Purple box with worker icon)
- WELL CONTROL SYSTEMS** (Orange box with folder icon)
- SUBSEA WELL RESPONSE** (Dark Purple box with subsea well icon)
- STANDARDS LIAISON** (Dark Red box with worker and document icon)
- ENERGY TRANSITION LIAISON** (Green box with gear and lightning bolt icon)

**The Wells Expert Committee (WEC) will continue to pursue our mission of preventing and mitigating high-impact well control events.**



International  
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of Oil & Gas  
Producers

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