WELL CONTROL TRAINING

From the Premier Provider in the Industry
INTRODUCTION

Well Control Training
Worldwide and World Class Training

WWCI would like to provide you with a brief overview of our training and services
Wild Well Control is the world’s leading provider of emergency firefighting, well control and related engineering services. These services are provided for operations onshore, inland waters, offshore and deepwater.
IADC WellCAP® Training

With the current political and economic climate can you afford to use any well control training but the best?
Wild Well Control Training

• 30 full time instructors
• Effective Interactive Training
• Electronic Killsheets
• Competency Based - 90 hands-on simulations based on real world situations
• Average 12 simulations per class
Training Locations

**Permanent**
- Houston, TX (DTC-Training Facility)
- Casper, WY
- Oklahoma City, OK
- Corpus Christi, TX
- Broussard/Lafayette, LA
- Odessa, TX
- Canonsburg, PA
- Aberdeen, UK
- Dubai, UAE

**Traveling**
- Alaska
- Northeast
- Mid Continent
- Rocky Mountains
- Southwest
- International

We currently average 65 classes + per month, 30 certified instructors, 250 in-house classes a year
Well Control Training

WELL CONTROL CLASSES
Types of Well Control Classes

• Wild Well Control offers many courses and variations
  – Course Levels include Supervisory, Fundamental & Introductory
  – Course Types include Standard or Accelerated courses offered as single classes or in multi-class combinations
    • Drilling including Surface and/or Subsea
    • Well Completion/ Well Workover
    • Well Servicing
      – Snubbing
      – Coiled Tubing
      – Wireline
    • Specialty Courses - HTHP, MPD, Air Drilling, CO₂ flood, Steam and Geothermal
Well Control Training Services

• Well Control Certification Programs
  – Accredited by the International Association of Drilling Contractors – IADC
    • WellCAP ® Program
  – Accredited by American Petroleum Institute – API
  – AESC (Association of Energy Service Companies)
  – IWCF in Europe, ME and S. East Asia
IADC WellCAP® Training Certification

- WWCI’s Well Control Training Division is the largest well control training provider for IADC, API and IWCF in the World. Over 9,000 students in 2010, 10,000 in 2011, and 11,000 in 2013.

- Our Well Control Training is unmatched, providing for operations onshore, inland waters, offshore and deepwater environment.
Hands on Competency

- **Permanent Training Locations around the World**
  - Pushing the envelope with tested simulations
    - Average 4 simulations per day per class
Real World, Real Experiences

- Case History Situations, Safety Meetings, Gap Analysis
  - Hands on approach
  - Competency Based
Instructors in Spanish and English

- Kill Sheets in Spanish
- Instructional material in Spanish
Instructors in Spanish and English

- Interactivity is not just a computer, it’s personal, high tech, hands-on worldly experience
Well Control Training

CASE HISTORY BASED LEARNING
Case Histories

- Wild Well Control teaches well control courses centered around actual case histories
- Case histories enable you to learn well control concepts and experience actual hands-on training with real world situations
- Each case history teaches different concepts and methods using a series of stages to continually build upon what you have learned
Case History Stages

1. The Introduction
   Sets the stage for each case history by introducing a new well control situation

2. The Learning Objectives
   Identify what you will learn from the lectures and exercises

3. The Skills & Topics
   Will teach you important well control concepts and review the skills that you will use during the hands-on exercises

4. The Actual Case History
   Gives you the details to conduct safety meetings/forward planning, operate the simulators and practice well control methods

5. Drawing Conclusions
   Provides a review of lessons learned
Learning Objectives

- Describes what the student must know and/or be able to do at the end of the module
- Learning objectives define the expected student performance
- They have measurable outcomes, which describe ways in which students will be asked to demonstrate that they have achieved the learning objectives

Preparing to kill the Mr. Mahler well
Skills and Topics

- Teach important well control concepts and review the skills through lecture, and hands-on exercises including
  - Presentations
  - Facilitated interactive teaching
  - Animations
  - Videos
  - Games
  - Safety Meetings
  - Homework and Review
Situational Awareness is Critical

• **Warning signs**
  – Usually reflect an ongoing sequence of events
  – How do we prevent these events?
  – The well will talk to you
  – Be prepared, be alert, and be aware of the ongoing operations at all times

• **Wild Well Control supports the industry belief that safety and training are imperative**
  – This course will focus on safety meetings and hands-on simulator exercises based on real world case histories

• **We do encourage team competition**
Well Control Training Simulators

- **Simulators**
  - Provide realistic look and feel of drilling controls
  - Accurately simulate how fluids and gases mix and interact in a well

- **Simulation Exercises**
  - Use actual case histories based on real world events
  - Model situations that students may encounter in the field
Drawing Conclusions for Lessons

- What lessons were learned?
- What methods were most effective?
- What were the results?
- What could have been done differently?
- What steps would you have taken under different circumstances?
- What skills need more practice?
- What forward planning would prevent this incident?
Rapid Fire Competition

This “rapid fire” game will help to evaluate your well control knowledge and experience through a series of challenging questions.
Well Control Training

LEARNING AIDES
Student Workbook and Tools

Student workbook
- Data sim sheets
- Case history forward planning forms
- Well control formulas & charts
- Killsheet forms

Tools
- Killsheet software
- Well Control Manual
- Technical Data Handbook
- Notebook
- Calculator
Ultimate Killsheet™ USB Card

- Wild Well Control’s Ultimate killsheet is the most comprehensive in the industry
- Choose from imperial, metric, or mixed units of measure
- Bullhead, Lubricate & Bleed, Subsea, Surface, and Volumetric killsheets are all included on one disc
Extensive Killsheet Exercises

The Wild Well Killsheets are Excel documents that have data entry fields for recording information about killing a well.

The Best Practice is to keep the killsheet updated as the well is drilled.

During exercises students will learn to enter information used to kill a well for each of the various well control methods.
Well Control Manual

• Excellent source of reference information for well control
• From air drilling to wireline and all points in between, the manual covers well control relative to all oil and gas operations
Technical Data Book

• A convenient pocket guide that is perfect for quick reference while in the field

• It contains numerous
  – Formulas
  – Charts
  – Tables that include:
    • Common & kick-related formulas and equations
    • Rules of thumb
    • Tubular capacities & displacement values
Why Training...

Can really you afford not to?
RIG SITE SERVICES

From the Premier Provider in the Industry
WELL CONTROL EQUIPMENT SURVEY

Rig Site Services
Well Control Equipment Survey

- Visual and external survey focused on the rig’s Well Control Equipment as a system
- Comprehensive checklist for all Well Control and Related Systems
- Immediate Concerns and Recommendations noted and corrective action(s) discussed with client
- Based on established and accepted industry practices (API, IADC,) unless other specifications have been provided by the Client
- WCES can proceed once the well control equipment has been rigged up and tested after the surface or intermediate casing has been set
Drilling is risky business. The reality is that the dangers associated with these types of operations cannot be eliminated—however, they can be mitigated. Based on its experience as the world’s leading supplier of firefighting, well control and related engineering services, Wild Well Control developed the Well Control Equipment Survey. By ensuring that all well control equipment is properly rigged up, Wild Well Control’s Well Control Equipment Survey helps the effort to eliminate or reduce these risks associated with well control.

The Well Control Equipment Survey encompasses a complete visual and external inspection of the well control equipment once it has been rigged up and tested, after the surface or intermediate casing has been set, and before or immediately after the shoe has been drilled out. A survey of well control equipment is especially advisable for critical, deep, HT-H or deep water drilling operations. This survey is focused on well control equipment as a system and includes a comprehensive checklist covering major areas of concern and over 200 individual components. The scope of the survey may be expanded on a case by case basis.

Areas the Well Control Equipment Survey addresses:

- BOP/Testing
- Rig Components
- Accumulator
- Annular Blowout Preventer
- Annular Blowout Preventer
- Drilling Cross
- Kill Line
- Choke Line
- Choke Manifold
- Mud Gas Separator
- Degasser
- Trip Tank
- Active Pit System
- PVT Volume Totalizer (PVT) Equipment
- Standpipe Valves and Pump Lines
- Drill Floor Equipment

Suitability of the well control equipment is evaluated based on established and accepted industry practices (API, JADC, MMS) unless other specifications have been provided by the Client. Any observations of unacceptable well control equipment are identified to the Client as:

- Immediate Concerns
- Recommendations
- Suggestions
- Comments

The well be noted on the final Well Control Equipment Survey report. Any immediate concerns noted during the survey will be discussed in detail with the Client’s representative on location and corrective measures are recommended or suggested prior to leaving location.

The rig surveys is limited to assessments that can be completed by visual and external inspection. Examples of excluded items are: internal inspection, function testing, tolerance measurements, non-destructive testing of any of the components and there is no review of the suitability of maintenance programs/procedures or verification of scheduled/recommended maintenance, use of OEM or approved replacement parts, material traceability or certifications.

Wild Well Control
Drilling Technology Center
2200 Oil Center Court
Houston, TX 77073
Tel: 281.794.4700

www.wildwell.com
Final Report

- Final Report to Client consists of:
  - All findings, Recommended actions and Industry Standards noted and supported with photos
  - WCES documented with photographs
  - Comprehensive checklist covering 15 major areas of concern
  - Completion & Signoff sheet
  - Electronic/hard copy to client
### GENERAL INFORMATION

**RIG INFORMATION**
- Rig Contractor: ABC
- Operator: XYZ
- Rig Number: 1
- Rig Location: Texas

**SURVEY INFORMATION**
- Survey Created By: Superintendent
- WWCI Surveyor: Erikson, Erika

**NOTES**
1. Survey is being conducted on well control equipment as per the incident.
2. Survey is being conducted as a visual inspection only.
3. Survey is being conducted and reported on the basis of observations made during the incident.

**EXPLANATION OF SERVICES**
This survey is for informational purposes only. It is based upon visual observations made during the incident. This survey is based only on visual observations made during the incident and is not a test of the equipment's condition or fitness for any particular use or any other purpose. This survey is not intended to be a comprehensive or exhaustive assessment of the equipment's condition or fitness for any particular use or any other purpose.

**WWCI REPORT APPROVAL**
Reviewed by: __________
Approved by: __________

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### SURVEY FINDINGS

<table>
<thead>
<tr>
<th>FINDINGS</th>
<th>RECOMMENDED ACTION</th>
<th>REFERENCES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>IMMEDIATE CONCERN</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Control lines damaged exposing wire core - 2 at end of suitcase that lead to kill line HCR, open line to ram cavity #2, both line at choke line HCR</td>
<td>Immediately replace hydraulic line</td>
<td>API RP 53 12.5.2</td>
</tr>
<tr>
<td>2 Four - 45 degree bends in panic line</td>
<td>Immediately install straight piping or targeted tees or block tees</td>
<td>API RP 53 6.3.1.a</td>
</tr>
<tr>
<td>3 One (1) stud/nut not fully engaged between kill line valves</td>
<td>Immediately make-up properly with full thread engagement</td>
<td>API RP 53 17.11.2</td>
</tr>
<tr>
<td>4 Stud/nut not fully engaged downstream of left hydraulic choke</td>
<td>Immediately make-up properly with full thread engagement</td>
<td>API RP 53 17.11.2</td>
</tr>
<tr>
<td>5 Stud/nuts not fully engaged on choke manifold flanges: 1 at panic line valve, 1 on left buffer chamber</td>
<td>Immediately make-up properly with full thread engagement</td>
<td>API RP 53 17.11.2</td>
</tr>
<tr>
<td>6 Stud/nuts not fully engaged on gas hanger: 6 on drain flange, 7 on flare line flanges, 16 on mud leg &amp; fluid leg flanges and 7 missing on same flanges, 1 missing on check valve flange on flare line</td>
<td>Immediately install missing bolting and make-up all bolting properly with full thread engagement</td>
<td>API RP 53 17.11.2</td>
</tr>
<tr>
<td>7 Two (2) stud/nuts not fully engaged between choke line and HCR</td>
<td>Immediately make-up properly with full thread engagement</td>
<td>API RP 53 17.11.2</td>
</tr>
<tr>
<td>8 Two (2) stud/nuts not fully engaged on flange between choke line HCR and choke line</td>
<td>Immediately make-up properly with full thread engagement</td>
<td>API RP 53 17.11.2</td>
</tr>
</tbody>
</table>

**RECOMMENDATION**
1. Choke line HCR handwheel not installed
   Recommend installing handwheel
   API SPEC 6A 10.5.3.6

*References are found in Appendix A

§ Findings originated in base survey.

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Equipment Review

ACCUMULATOR

Control lines damaged at end of suitcase
## WCES Example Continued

<table>
<thead>
<tr>
<th>FINDINGS</th>
<th>RECOMMENDED ACTION</th>
<th>COMPLETION DATE</th>
<th>SIGN OFF SIGNATURE</th>
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<tbody>
<tr>
<td>1 Studs/nuts not fully engaged on choke manifold flanges, 1 at panic</td>
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<td></td>
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<td>Immediately replace hydraulic line</td>
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<tr>
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<td></td>
<td></td>
</tr>
</tbody>
</table>
Advantages:

- Recommendations for corrective actions based on Wild Well Control’s expertise as the industry leader in well control practices.
- Peace of Mind in knowing your operation is capable
- Third party Gap analysis consistent with SEMS
KICK DRILL ASSESSMENTS
Kick Drill Assessments at the Rigsite

- Personnel Assessment of Well Control knowledge, readiness and competency at the job site.
- Quantitative and Qualitative Assessment of the drill crews ability to react to a kick and properly shut the well in.
- A timed kick drill is required either simulated or actual.
- Immediate concerns are addressed and crew awareness for well control issues discussed, consistent with WC training.
- Based on established and accepted industry practices (API, IADC, BOEM/BSEE) unless other specifications have been provided by the Client.
- Each crew member has an individual assessment and all crews participate.
Wild Well Control developed the Rig Site Assessment through Kick Drills based on our extensive experience working with pressure control/well control events and determining why these incidents occur. From the lessons learned, the Rig Site Assessment through Kick Drills was designed to evaluate the readiness of the rig crew and prepare them to respond to any concerns or issues.

Kick Drills offer an effective measure of the rig crew’s response to a well control kick. While on location, the Wild Well Control Rig Site Training Coordinator will work with all rig personnel (all tours) and review their response skills and knowledge both individually and as a team.

Prior to conducting the Kick Drill, the coordinator visits with all team members to discuss their specific individual roles, review knowledge of equipment and operations, and remind them of the importance of their duties to daily operations and emergency response situations. Upon completion of the drill, the coordinator will review the response actions with the team.

During the assessment, the coordinator will also emphasize and review the following with the crew: causes of kicks and the warning signs, shut-in procedures, and proper personnel response during a well control event. The crew will gain an understanding of how critical they are to everyday operations and the prevention of a well control incident. Through the Kick Drill, the rig crew will gain confidence individually and as a team and in their operational skills and response capabilities.

The Rig Site Assessment through Kick Drills is completed on location and will not interfere with on-going operations. The assessment will take approximately three (3) hours per crew; the allotted time does not include interruptions necessary for ongoing rig operations. Individual and team assessments will be completed and documented in an electronic report to the customer.

Upon completion of the drills and assessment, the following materials will be left on location to reinforce the training:

- Emergency Response Poster - a laminated Emergency Response Poster that includes Shut In Procedures and the Driller’s Method of well control.
- Killsheet Poster - one laminated killsheet poster plus one set of ledger size laminated killsheets for daily use. The electronic version of the killsheet will be loaded onto the computer of the Company Man and Rig Manager.
- Wellsite Preventive Measures Handbook & Tally Book - includes Warning Signs of Kicks, Shut In Procedures, Driller’s Method and detailed information on each crew member’s responsibilities.
- Participation Awards
RIG SITE ASSESSMENT THROUGH KICK DRILLS

PO/AFE/SAP Number: __________________________

Date: __________________________  Job Number: 2012-TS

Tour:  □ Day  □ Night  □ 2nd Days  □ 2nd Nights

Stand-by

Kick Drill Coordinator: __________________________

City: __________________________  County: __________________________  State: __________________________

Rig Contractor: __________________________  Rig Number: __________________________

Rig Operator: __________________________

Well Name: __________________________

Rig Manager: __________________________

Company Man: __________________________

Drill Performed:  □ BOP  □ Trip  □ NONE

Driller: __________________________

Assistant Driller: __________________________

Derrick Hand: __________________________

Pit Hands: __________________________

Motor Hand: __________________________

Floor Hand (Choke Manifold): __________________________

Floor Hand (Rig Floor): __________________________

Floor Hand #2 (Rig Floor): __________________________
Crews are challenged in a non-threatening environment

Test their knowledge of critical equipment operations
## Personnel Assessment

### DRILLER

<table>
<thead>
<tr>
<th>Overall Readiness Rating:</th>
<th>MAINTAIN READINESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Procedures:</td>
<td>FAIR</td>
</tr>
<tr>
<td>Equipment:</td>
<td>GOOD</td>
</tr>
<tr>
<td>Responsibilities:</td>
<td>GOOD</td>
</tr>
</tbody>
</table>

#### Comments:
- Slow pump rate / pressures - can explain
- Shut-in procedures - can explain
- Hard vs. Soft shut-in - can explain
- Driller's Method or Wait & Weight Method - needed guidance to explain
- Water based kicks vs. oil based mud kicks - needed guidance to explain
- Remote BOP Closing Unit - understands it
- SIDPP - can explain it
- SIDPP - does not know how to acquire it
- Wellbore volumes and strokes for kill sheet - can calculate
- Weekly BOP / Trip drills - does conduct drills and trains rig crew

<table>
<thead>
<tr>
<th>BOP School Attended:</th>
<th>Wild Well Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Certified As:</td>
<td>Fundamental</td>
</tr>
<tr>
<td>Years of Experience in Job:</td>
<td>15.0</td>
</tr>
</tbody>
</table>

#### Well Control:
- When the warning signs of a kick are observed, if well is flowing, is well shut-in immediately
- Verifies that a kick has occurred
- Prior to closing BOPs, have floor hands s
- Knows to record time of well shut-in, SIDPP, SIC
- In drilling mode, knows how to get SIDPP
- Knows the purpose of the SIDPP
- Can calculate wellbore volumes and strokes to

#### Responsibilities:
- Keeps Rig Manager and Company Man abreast
- Trains rig crew by conducting weekly BOP / Trip
- Notifies Rig Manager and Company Man that a
- Organizes crew for kill operations
- Remains at drilling console to operate rig and
- Has a current well control card

#### Procedures:

1. Purpose of slow pump rate / pressures
2. Shut-in procedures while drilling
3. Shut-in procedures while trippping
4. Differences - Hard vs. Soft shut-in
5. Recognizes and understands warning signs of a kick
6. Driller’s Method or Wait & Weight Method
7. Understands differences between water based kicks and oil based mud kicks

#### Equipment:

1. Ensures that the TIW and BOP are in proper position and in good condition
2. Are the TIW and BOP inspected daily for ease i
3. Proper wrenches readily available for TIW and
4. Understands the BOP stack
5. Understands the Remote BOP Closing Unit
6. Understands the choke line valves and positionit
7. Understands the choke manifold (manual chok
8. Understands the Mud-Gas Separator (gas busts

#### Supervisor:

[Signature]
Final Report

- Final Report Consists of:
  - Electronic copy
  - Findings and considerations for action
  - Gap analysis consistent with SEMS for each crew member
  - Invoices for approval
Thank you.

Please visit wildwell.com