

# **Murchison Drilling Schools, Inc.**

*Global Leader in Drilling Operations  
and Well Control*

## **2019 In-House Information**



## Letter from the President

On behalf of Murchison Drilling Schools, Inc. (MDS), I want to thank you for your interest in an in-house course for your company. We appreciate the opportunity to train your personnel, and we take this responsibility very seriously. MDS is committed to providing quality training for our industry. We specialize in operational drilling technology and in well control training. We have been an industry leader in training for over thirty-eight years.



Our approach in training has been simple, but very effective. We start with an excellent teaching staff. Our lead instructors all have excellent field experience in world-wide drilling operations, and have received training from MDS. They have also been certified as instructors with the International Association of Drilling Contractors (IADC) and with the International Well Control Forum (IWCF).

Second, our classes focus on training and competency rather than just certification. The classroom lectures and workshops are followed by homework exercises to reinforce the principles that have already been taught. The homework is reviewed each day so that students have an opportunity to learn and gain understanding from the problems that they have missed.

Third, in our courses that offer well control certification, there is extensive simulator work. In our ten-day Operational Drilling Technology (ODT) course, there are six simulator problems. It has been our experience that it takes four simulator problems before most people begin to gain confidence and competence in handling well control problems. Each simulator group is assigned a simulator instructor where they are given one-on-one instructions and training. Students learn to recognize and properly handle a variety of well control problems, such as plugged chokes, washed-out chokes, pump failures, washed-out bits and plugged bits. Students use a variety of well control methods, including the Driller's Method, Wait & Weight Method, Volumetric Method, and Lubrication. They also do simulator work on both vertical and horizontal wells.

Finally, our courses are taught from an operational perspective. MDS has gone to great lengths to make sure that all the material that is presented can be easily understood and applied by rig personnel. We have tried to bridge the gap between academic knowledge and the field application of that knowledge. Students learn to pre-plan all facets of drilling and well control operations in ways that can be easily implemented in the field by rig personnel.

Again, I want to personally thank you for your interest and desire for MDS to train your personnel. This information packet has been put together to answer some of your questions about in-house training. We look forward to working with you.

Regards,

A handwritten signature in blue ink that reads "William J. Murchison, Jr." The signature is fluid and cursive, with a small flourish at the end.

William J. Murchison, Jr.  
CEO/President

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## Our Company

At the request of major oil companies and service companies, Murchison Drilling Schools (MDS) was founded in 1977 by Bill Murchison. During Bill's last seven years in Iran, he was asked to start a training program for the Iranian Oil Consortium. He put together a training manual and program that was not only highly effective but also very well received by contractors and service companies as well as the operators. When Bill left Iran in 1977, the operating and service companies asked him to start his own business so that they could continue sending their drillers, toolpushers, foremen and engineers to him for training. Bill moved to Albuquerque, New Mexico and put together the Operational Drilling Technology (ODT) Course. MDS has been training people on a worldwide basis since that time.

MDS specializes in training in drilling operations. The ten-day ODT teaches drilling foremen to supervise drilling operations. The five-day Practical Drilling Technology (PDT) course helps equip drilling personnel with the technical tools needed to become effective supervisors. The five-day Advanced Drilling Technology (ADT) is the sequel to the PDT. This is a supervisor level course that is suited for experienced operator, contractor, and service company personnel. The two-day Floater Operation Transitions course helps experienced surface personnel transition to floating drilling operations. The five-day well control courses that MDS offers gives all levels of drilling personnel practical instruction and training in well control operations.

One of the keys to the success of MDS has been the combination of good operational practices and the use of case histories. Bill kept very good notes throughout his career and has been able to help men and women learn valuable lessons from his first-hand experiences. MDS instructors use both current and older case histories in maintaining this approach to teaching.

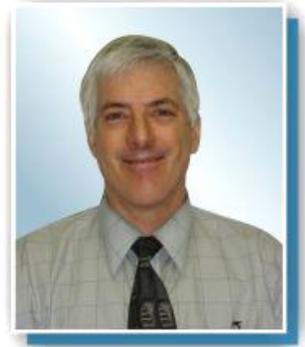
Another key to the success of MDS has been hiring highly qualified and experienced drilling personnel. MDS instructors are able to share both knowledge and experience with students. Students are able to ask questions and glean from the first-hand experience of the instructors.

Another key that has helped MDS to be highly successful has been its approach to well control and other drilling problems. Instructors teach drilling problems such as well control the same way that the hole is drilled. They approach each section of the hole differently, explaining the problems and solutions that are unique to that section of hole. Thus, well control and other drilling problems are covered several times during the course and students gain a better overall understanding of drilling problems.

## Worldwide In-house Training Instructors

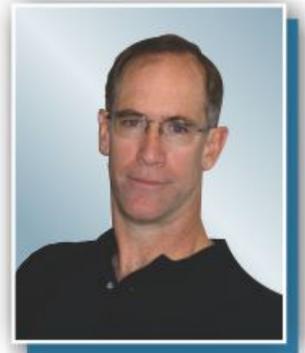
### **Bill Murchison, CEO Instructor, Albuquerque Training Center**

Bill has a BBA from Texas Christian University. Bill has been working for MDS since 1997. Before joining MDS, he managed several other companies in other industries. Bill has over thirty years of experience in training and teaching. He is a certified IADC WellSharp and IWCF well control instructor and assessor.



### **Tim Arnold, Vice President, Instructor, Albuquerque Training Center**

Tim has a Petroleum Engineering degree from the Colorado School of Mines, and has over thirty years of experience in drilling operations. Tim joined the MDS teaching staff after retiring from Marathon Oil Corporation in February 2011. Tim has a varied experience, working on land rigs, jack-ups, semi-submersibles, and drill ships. Tim is a certified IADC WellSharp and IWCF well control instructor.



### **Bob Haagensen, Instructor, Albuquerque Training Center**

Bob has a BA from the University of Colorado and an MA from Western State College. He has over thirty-two years of operational experience, working both internationally and domestically. His primary area of expertise is drilling fluids. Before joining MDS, Bob worked for MI Drilling Fluids. In addition to excellent operational experience, Bob also has sixteen years of teaching experience. Bob is a certified IADC WellSharp and IWCF well control instructor.



### **John Breidenthal, Manager, Instructor, Houston Training Center**

John has a Petroleum Engineering degree from the University of Kansas, and has thirty seven years of experience in drilling. He has worked as a field drilling engineer for deepwater and jackups, drill site manager, production supervisor, and well control instructor for a major oil company. John has varied experience working on land rigs, jack-ups, and drill ships. He is a certified IADC WellSharp and IWCF well control instructor.



### **Willie Lyon, Instructor, Houston Training Center**

Willie Lyon has a Petroleum Engineering degree from Texas A&M, and has forty-five years of experience in drilling operations. He joined MDS in 2009 as a Lead Instructor. He has worked as a production engineer, drilling engineer, manager of engineering, manager of operations, and as a drilling consultant. Willie has a varied experience, working on land rigs, jack-ups, semi-submersibles, and drill ships. Willie is a registered PE and is a certified IADC WellSharp and IWCF well control instructor. He is also a member of the AIME/SPE and the IPAA.



### **Richard Quick, Instructor, Houston Training Center**

Richard has thirty seven years of experience in drilling. He has held positions from roustabout to drilling superintendent, including four years as a well control instructor. Richard is previously retired from a major oil company where he was part of a well engineering process safety team. He is a certified IWCF & IADC well control instructor.



### **Charles “Chuma” Ubaru, Houston Training Center**

Chuma has 32 years of experience in drilling on land rigs, jack-ups and semi-submersibles. He worked in various positions from roustabout to rig manager, well control instructor, drilling engineer and drilling supervisor. He is a certified project management professional (PMP) and member of the project management institute (PMI) with a BS degree from University of Benin, Nigeria and MEng degree from the University of Calgary, Canada.



### **Gordon Poss, Instructor, Colorado Training Center**

Gordon Poss has been hired as our instructor in the Colorado, Wyoming & North Dakota regions. Gordon has a BS in Petroleum Engineering from the Colorado School of Mines. He has over forty years of operational experience. After graduating, he worked as a drilling engineer, senior drilling engineer supervisor and specialist, as well as a drilling manager. Gordon has experience with HPHT drilling, MPD operations, desert operations, exploring drilling, offshore drilling and workover, and research and development. He has varied experience, working on land rigs, jack-ups, semi-submersibles, and drill ships. Gordon is a registered PE and is a certified IADC Supervisor (Level 4) combined surface/subsea well control instructor.



### **Cecil Duke, Instructor, Permian Training Center**

Cecil graduated from Southwestern Oklahoma state University with a BS degree Natural Resource Management/ Chemistry. I began working in the oil Industry in 2007 as a mud engineer in the Rocky Mountains. In 2012 I founded CD Fluid Training and began teaching Drilling Fluids school at Vernon College in north Texas.



## In-House Requirements

The following information provides understanding about in-house classes, how to schedule an in-house class, the requirements for an in-house class, and the responsibilities of both parties.

1. **Definition** - An in-house class is one that is taught for a sponsoring company and does not have open enrollment. The sponsoring company determines who the participants in the course will be. An in-house class can be taught at the sponsoring company's facilities, a hotel or other facility, or at one of MDS' training centers.
2. **Coordination** - All in-house classes are coordinated through Bill Murchison.  
email: [billjr@murchisondrillingschools.com](mailto:billjr@murchisondrillingschools.com)



### In-house course in Suriname

3. **Scheduling** - In-house classes are scheduled and taught throughout the year. MDS schedules in-house classes when: (a) there is an available instructor(s), (b) a regularly scheduled class that does not have any enrollments can be cancelled and the in-house class can be taught in its place. A large percentage of MDS students are international and book their classes and flight reservations four to eight months in advance. MDS' policy is not to cancel a class once there is an enrollment in the class. MDS has a very active in-house training program and a number of companies will book multiple time slots for the upcoming year in order to lock in their targeted dates. Therefore, most in-house classes must be booked six months to a year in advance. Once a date, or dates, has been agreed upon by MDS and the sponsoring company, MDS will prepare and submit a contract to the sponsoring company for their review and signature. MDS will lock in the date of the class once it receives the signed contract.

4. **Contract** - MDS requires a signed contract for all in-house classes. The contract covers the course to be taught, the date of the training, the cost of the course, the responsibilities of MDS and the responsibilities of the sponsoring company. The contract also gives the contact information for both the sponsoring company and for MDS. Some companies require extra provisions, like a force majeure clause, to be included in the contract. In these cases, MDS and the sponsoring company combine both agreements into one mutually acceptable agreement.
5. **Number of Participants** - MDS requires a minimum of six (6) people for in-house classes. MDS requires the sponsoring company to give a firm headcount in advance so that the appropriate amount of materials can be shipped, and the appropriate amount of instructors can be scheduled. The maximum number of participants in a class varies depending on which class is being taught, and by the appropriate certification authority, if well control certification is being offered. If no certification is being offered, the sponsoring company will determine the maximum number of participants. As a general rule, MDS tries to keep the maximum class size to eighteen (18) or less so that there is more classroom participation. IWCF classes have a class limit of twelve (12).
6. **Facility Requirements** - The main classroom being used should accommodate the scheduled number of participants. It should have dry-erase boards, an LCD projector, 110-Volt power supply (or transformers available), and proper lighting. If the course includes well control, an additional room(s) is required for the simulator exercises and testing. These rooms should be locked up after class each day. Other facility requirements depend on the type of course and the certification being offered. For IADC well control certification, WIFI is required. Each laptop must be able to log into the IADC website to take the knowledge assessment. There are also spacing requirements for the testing at the conclusion of the course. Individual desks should be spaced one meter apart. For IWCF courses, prior facility approval must be obtained from the IWCF. The sponsoring company is responsible for providing the necessary information to obtain the IWCF Temporary Facility approval, and for paying the IWCF fee (approximately \$2,300.00). The sponsoring company should also arrange for a conference room (preferably at the hotel where participants are staying or another convenient location) for the participants to use each night to work on homework exercises.
7. **Reimbursable Expenses** - The sponsoring company is required to reimburse MDS for certain expenses. There is a fifteen percent (15%) markup on all reimbursable expenses. Some sponsoring companies elect to pay for many of these expenses so that they are not included in the reimbursable expenses. The following expenses are normally considered reimbursable expenses that will be charged to the sponsoring company.
  - a. **Travel Expenses** - The sponsoring company is responsible for the airline and other travel expenses. MDS Instructors fly Coach Class on domestic flights and Business Class on international flights. Flights reserved by the client must be approved by the instructor before they are purchased. International flights that are transferrable and refundable should be purchased if that option is offered. Any overweight charges due to carrying books, materials, simulators, or training related materials are included in the travel expenses. All visa permit charges are also considered travel expenses.
  - b. **Hotel and Meal Expenses** - The sponsoring company is responsible for all hotel and meal expenses for MDS instructors while conducting the training. Most companies set up a master account for the MDS instructors so that this charge is not included in the reimbursable charges.

- c. **Local Ground Transportation** - The sponsoring company is responsible for arranging local ground transportation to and from the training center and the hotel, or for a rental car if used.
  - d. **Shipping Expenses** - The sponsoring company is responsible for all shipping and shipping related charges for books, materials, supplies, and simulators. This includes any fees for Certificate of Origin, Certificate of Registration, insurance, or import fees.
  - e. **Certification Expenses** – For an IADC WellSharp or IWCF well control course, the sponsoring company will be required to pay for all invigilator/proctor-related expenses such as food and accommodation, travel, and shipping expenses. MDS will be responsible for the normal invigilator/proctor fees for testing.
8. **Cancellation Fee** - Notification of class cancellation within thirty (30) days of the scheduled course date will result in a five thousand dollar (\$5,000.00) cancellation fee. Any airline tickets or other reimbursable expenses already incurred as part of carrying out this contract will also be paid by the client.
9. **Evaluations** - MDS will conduct one-on-one evaluations with the participants at the conclusion of the course. Diplomas and certificates will be presented at that time. In addition, MDS will send the sponsoring company comprehensive individual evaluations (see sample evaluation on next page). MDS will also send an electronic spreadsheet with course details for all their students. At year-end, MDS will send the company an end of year (EOY) report that gives an updated composite of all company employees that have been through MDS courses. This EOY report also provides comparisons to the industry at large.

# Sample Student Evaluation



**Murchison Drilling Schools, Inc.**  
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 www.murchisondrillingschools.com

## OPERATIONAL DRILLING TECHNOLOGY STUDENT EVALUATION FORM

Student: Sam Sample  
 Company: ABC Drilling Company  
 Dates: Jan 08 - 19, 2018  
 Location: Houston, TX

Seat # 1

### HOMEWORK SUMMARY

Communication	93.33	Subsea Gauge	100.00
Drill String Design	92.00	Casing and Cementing	94.74
Kill Sheet	100.00	Trend	93.75
Mud	97.37	Well Control 2	96.36
Equipment 1	93.48	Logging	94.12
Solids	100.00	Freeing Technique	95.00
Stuck Pipe	90.00	Kick-Off Plug	92.31
Lost Circ. in Top Hole	91.30	Well Control 3	96.23
Tripping	91.07	Lost Circ. Propagation & Gas Cap	90.91
H <sub>2</sub> S	90.91	Workover & Completions	92.31
Well Control 1	96.23	Equipment 2 - <i>Bonus</i>	87.30
Surface Gauge	97.44	Operational WC & Sim. - <i>Bonus</i>	86.36

### SIMULATOR SUMMARY

Simulator Assessor	John Breidenthal	Simulated Problem	Choke Plugged
Pre-Drilling	88.89	Simulator Score	95%
Kill Preparation	100.00	Critical Fail?	_____
Kill Operation	95.74	Pass/Fail	Pass

### IADC

Certification Type	Combined S/SS
Certification Level	Supervisor
Certification Results	Pass
Simulator Test	95%
WellSharp	91.00
Workover & Completion	96.00

### COURSE SUMMARY

Homework Average	98.67
Test Average	93.50
Overall Average (TADS)	90.04
Classwork Average (HW & FT)	93.54
% of Improvement	41.93%

### STUDENT LEVEL

Initial Test	62.30	Comparison To Industry Average	2.42%
Final Test	88.42	Comparison To Industry Average	1.87%

### INDUSTRY LEVEL

Industry Initial Test Average	60.83	Industry Final Test Average	86.80
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Sam was great to have in class. He participated in all discussions, did all the homework exercises and bonus homework, and had an excellent attitude. Sam is a good communicator and shows outstanding leadership abilities. Sam passed his IADC WellSharp certification at a Supervisory level for Combined Surface/Subsea.

## Requirements for Well Control Certification

The following information applies to each course that offers well control certification: Operational Drilling Technology, and Well Control levels 2-4.

### IADC Candidate Notes:

- The IADC has an online WellSharp Practice Exam to help those trainees who have test anxiety and want to become more familiar with the process of taking an online WellSharp exam. Four exams are currently available: Driller - Surface Stack, Driller - Combination Stack, Supervisor - Surface Stack, and Supervisor - Combination Stack. For access to these exams, go to this website: [www.iadc.org/wellsharp/sample-wellsharp-exams](http://www.iadc.org/wellsharp/sample-wellsharp-exams)

### IWCF Candidate Notes:

- IWCF candidates must have already been certified at Level 2 or Level 3 to be eligible to test for Level 3 and likewise, Level 3 or Level 4 to be eligible to test for Level 4.
- IWCF candidates must register for an account on FORUM. Once registered and approved by the IWCF, a candidate ID number will be issued. IWCF candidates will need their candidate ID before registering for a well control course. IWCF candidates can register on FORUM at [www.iwcf.org](http://www.iwcf.org).
- The IWCF requires IWCF testing centers to order the IWCF tests ten days prior to the exam date. Therefore, MDS requires all course participants to enroll at least one week prior to the first day of the class. Participants must indicate at the time of enrollment the following information: Type of Certification (Surface or Combined Surface/Subsea), Units of Measurement (API, Metric), and Language for written test. Participants must also provide a scan of their most recent certificate to verify their eligibility.
- All candidates must bring their passport and present it to the assessor and the invigilator before tests are administered. (U.S. citizens born in the U.S. who do not have a passport may present their driver's license.)
- To be adequately prepared for the IWCF exam, candidates should complete the IWCF homework **prior to coming** to a well control course. There is a significant amount of other homework during the course.
- We also strongly recommend reviewing "Training & Qualifications" at [www.iwcf.org](http://www.iwcf.org) to help prepare for the exam.



## Overview of MDS Courses

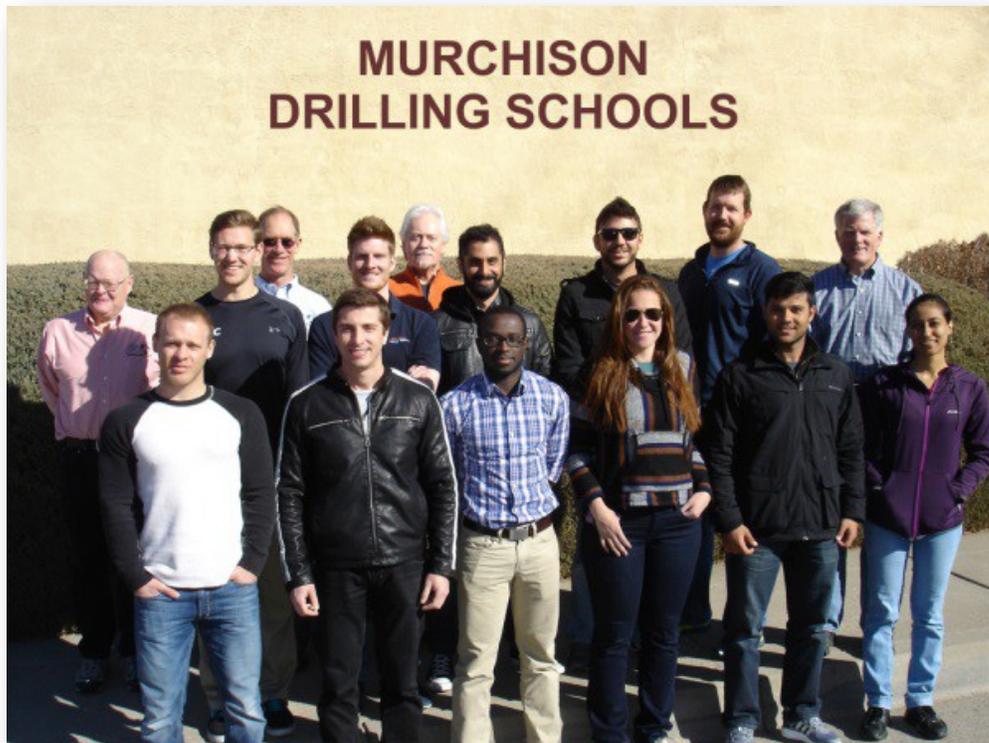
### Operational Drilling Technology (ODT)

#### OBJECTIVE:

Our objective is to train drilling supervisors how to properly supervise a drilling operation. This ten-day course covers drilling practices and problems from spud to completion for all levels from assistant driller to drilling manager. The course is taught by hole-intervals starting with top-hole problems related to big-hole and normal pressure. After an appropriate casing string has been set, drilling continues into the abnormal pressure zone and heavy mud practices and problems are discussed. Well control is introduced as one of the drilling problems and taught by hole-interval, with training enhanced by hands-on simulator practice. Associated problems such as lost circulation and stuck pipe are discussed along with well control. IWCF and IADC WellSharp Level 4/Supervisor Well Control certifications are offered through this course. Students must select which certification they desire when enrolling in the course. Individual student evaluation reports are written at the end of the session and these, along with the extensive workshops and exercises required, enable the instructor to assess the student's operational or technical strengths or weaknesses.

#### COURSE FEES:

- \$5,100.00 for IADC WellSharp – Supervisor certification, Surface or Subsea
- \$5,300.00 for IADC WellSharp and Workover/Completion, Surface or Subsea
- \$5,500.00 for IWCF – Level 4 certification, Surface or Subsea



## **Practical Drilling Technology Course (PDT)**

### **OBJECTIVE:**

The objective of this five-day drilling technology course is to equip drilling personnel with the technical tools needed to become effective supervisors. This is Part One of a two-course series in drilling technology. This course is suited for operator, contractor, and service company personnel who want more understanding about drilling operations.

### **COURSE FEES:**

- \$2,800.00

## **Advanced Drilling Technology Course (ADT)**

### **OBJECTIVE:**

This five-day course is the sequel to the PDT. Participants are recommended to complete the PDT and a well control course prior to enrolling in the ADT. This is a supervisor level course that is suited for experienced operator, contractor, and service company personnel.

### **COURSE FEES:**

- \$2,800.00

## **Introduction To Drilling (ID)**

### **OBJECTIVE:**

This three-day course is ideal for: people that are new to drilling, office personnel, or others that want a better understanding of drilling operations. There is a brief history of the oil and gas industry, an overview of the various parties (operators, contractors, service companies), and a look at the overall drilling process. There is an overview of both vertical and horizontal wells. Then, the various parts of a drilling operation are covered, such as: drilling fluids, drilling equipment, well control equipment, well control principles, tripping, cementing and casing, and drill string.

### **COURSE FEES:**

- \$1,800.00

## **Stuck Pipe and Fishing (SPF)**

### **OBJECTIVE:**

The objectives of this three-day course are to present methods of preventing and freeing stuck pipe, and also to present the philosophy and methodology of fishing. A review of common fishing tools and their uses will also be presented. The course is designed for supervisors with knowledge of normal drilling operations.

### **COURSE FEES:**

- \$1,800.00

## **Floater Operation Transitions Course (FOT)**

### **OBJECTIVE:**

This two-day course is designed to help experienced surface personnel to transition into floater drilling operations. It exposes individuals to the different and unfamiliar systems, such as motion compensators and BOP control systems, and also explains the shift in thinking that is necessary for successful, deepwater operations.

### **COURSE FEES:**

- \$1,200.00

## **Well Control – Introductory/Level 2 (WC-2)**

### **OBJECTIVE:**

The objective of this three-day course is to lay a solid foundation in well control. The U-Tube concept, gas laws, basic math skills, pressure basics, kick detection, kill sheet, drilling fluids, BOP equipment, shut-in procedures, and basic methods of well control are all covered. Candidates can sign up for either IWCF or IADC WellSharp certification.



### **COURSE FEES FOR INTRODUCTORY (LEVEL 2):**

- \$1,200.00 for IADC WellSharp certification, Surface or Subsea
- \$1,500.00 for IWCF certification, Surface or Subsea

## **Well Control – Driller/Level 3 (WC-3)**

### **OBJECTIVE:**

The objective of this course is to teach well control competency to drillers and others requiring a Level 3 (Driller) certification. A secondary objective is to prepare participants for either the IWCF or IADC WellSharp well control exams. Certification is given for Surface or Combined Surface/Subsea. BOP equipment, kick detection, shut-in procedures, kill sheets, and methods of well control are taught. The simulator work in the course focuses on detecting kicks, and closing in the well, and handling an assortment of simulated problems.

## **Well Control – Supervisor/Level 4 (WC-4)**

### **OBJECTIVE:**

The objective of this course is to teach well control competency to toolpushers, OIMs, wellsite supervisors, superintendents, and engineers. A secondary objective is to prepare participants for either the IWCF or IADC WellSharp well control certification exams. Certification is given for Surface or Combined Surface/Subsea. BOP equipment, drilling fluids, barrier management, kick detection, shut-in procedures, kill sheets, various methods of well control, and organizing a well control operation are all taught in this course. A thorough understanding of how well control problems develop, how they should be solved, and how to prevent them are discussed. There is an extensive amount of simulator work in the course with an assortment of simulated problems.

### **COURSE FEES FOR DRILLER (LEVEL 3) AND SUPERVISOR (LEVEL 4):**

- \$1,350.00 for IADC WellSharp Surface certification (4-day course)
- \$1,400.00 for IADC WellSharp Combined Surface/Subsea certification (4-day course)
- \$300.00 for IADC & Workover Supplement, (1-day Supplement)
- \$2,250.00 for IWCF certification, Surface or Subsea (5-day course)

## **Oil and Gas Operator Representative Workover and Intervention Well Control**

### **OBJECTIVE:**

MDS is pleased to now offer this new IADC well control course (IADC made this course available in 2018) that is designed for Operator Representatives supervising workovers and interventions. This 5-day course concludes with student candidates receiving an IADC WellSharp well control certificate for this type of operation. The course covers a wide variety of well control considerations for various intervention techniques/activities including coiled tubing, snubbing, and wireline operations. Well control equipment to conduct these types of operations is investigated as well as appropriate well control procedures. Satisfactory completion of the course requires passing the IADC WellSharp written test for this certification. No simulator test is required by IADC, however, students will have work sessions on the simulator performing well control operations using techniques such as bullheading, lubricate and bleed, reverse circulating, driller's method and volumetric well control. This course is designed for surface wellheads (not sub-sea wellheads).

### **COURSE FEES Oil and Gas Operator Representative Workover and Intervention WC Course:**

- \$1,500.00 for IADC WellSharp Workover & Completion certification (5-day course)

## MDS Course Outlines

<b>Practical Drilling Technology Course Outline</b>				
<b>Monday</b>	<b>Tuesday</b>	<b>Wednesday</b>	<b>Thursday</b>	<b>Friday</b>
<ul style="list-style-type: none"> <li>• Introduction</li> <li>• Entrance Test</li> <li>• Making Hole Video</li> <li>• Communication</li> <li>• Rig Math</li> <li>• Pressure Basics</li> <li>• Hole Trends – Basics</li> <li>• Overview of Land and Subsea</li> <li>• Bits</li> </ul>	<ul style="list-style-type: none"> <li>• Mud Basics</li> <li>• Mud Solids</li> <li>• Wellhead Installation – Surface</li> <li>• Wellhead Installation – Subsea</li> <li>• Drill String Basics</li> <li>• Circulation System Basics</li> </ul>	<ul style="list-style-type: none"> <li>• Well Under Control Video</li> <li>• Tripping Basics</li> <li>• Lost Circulation in Vugular Formations</li> <li>• Shallow Gas</li> <li>• Diverting</li> </ul>	<ul style="list-style-type: none"> <li>• Drillout Considerations – Casing Testing</li> <li>• Leak-Off and Formation Capability Tests</li> <li>• Causes of Abnormal Pressure</li> <li>• Well Control Red Flags &amp; Transition Zone Indicators</li> <li>• Limitations to Control</li> <li>• Casing and Cementing Basics</li> <li>• Deviation &amp; Stuck Pipe Principles</li> <li>• H<sub>2</sub>S</li> </ul>	<ul style="list-style-type: none"> <li>• Kick Recognition</li> <li>• Basic Methods of Well Control</li> <li>• Casing Shoe Pressure</li> <li>• Q &amp; A Session</li> <li>• Final Test</li> </ul>
<b>Homework</b>	<b>Homework</b>	<b>Homework</b>	<b>Homework</b>	
<ul style="list-style-type: none"> <li>• Communication</li> <li>• Trends</li> </ul>	<ul style="list-style-type: none"> <li>• Circulation and Drill String</li> <li>• Mud</li> <li>• Solids</li> </ul>	<ul style="list-style-type: none"> <li>• Tripping</li> <li>• Top Hole Lost Circulation</li> </ul>	<ul style="list-style-type: none"> <li>• Casing and Cementing</li> <li>• Hydrogen Sulfide</li> </ul>	

## MDS Course Outlines

<b>Advanced Drilling Technology Course Outline</b>				
<b>Monday</b>	<b>Tuesday</b>	<b>Wednesday</b>	<b>Thursday</b>	<b>Friday</b>
<ul style="list-style-type: none"> <li>• Introduction</li> <li>• Entrance Test</li> <li>• Problem Solving Model</li> <li>• Pre-Spud Meeting</li> <li>• Communication</li> <li>• Top Hole Cleaning</li> <li>• Trends</li> <li>• Drill String Design</li> <li>• Shallow Gas &amp; Diverting</li> </ul>	<ul style="list-style-type: none"> <li>• Advanced Mud Topics</li> <li>• Tripping Practices</li> <li>• Casing &amp; Cementing</li> </ul>	<ul style="list-style-type: none"> <li>• Casing Drillout &amp; Testing</li> <li>• Leak-Off &amp; FIT Tests</li> <li>• Well Control &amp; Transition Zone Indicators</li> <li>• Shales</li> <li>• Differential Sticking &amp; Freeing Techniques</li> <li>• Kick-Off Plug</li> <li>• Logging</li> </ul>	<ul style="list-style-type: none"> <li>• Lost Circulation From Propagation Losses</li> <li>• Lost Circulation in Gas Cap</li> <li>• Hydraulics Workshop</li> <li>• HPHT Drilling</li> </ul>	<ul style="list-style-type: none"> <li>• Limitations to Control Capability</li> <li>• Salt Water Flows</li> <li>• Underground Blowouts</li> <li>• Advanced Well Control Methods</li> </ul>
<b>Homework</b>	<b>Homework</b>	<b>Homework</b>	<b>Homework</b>	
<ul style="list-style-type: none"> <li>• Drill String Design</li> <li>• Trends</li> </ul>	<ul style="list-style-type: none"> <li>• Tripping</li> <li>• Mud</li> </ul>	<ul style="list-style-type: none"> <li>• Casing &amp; Cementing</li> <li>• Stuck Pipe</li> <li>• Freeing Technique</li> </ul>	<ul style="list-style-type: none"> <li>• Hydraulics</li> <li>• Propagation &amp; Fractured Carbonate Losses</li> </ul>	

## MDS Course Outlines

Operational Drilling Technology – Daily Outline (Week One)	Homework Assignment
<p><b>DAY ONE</b></p> <ul style="list-style-type: none"> <li>• Introduction</li> <li>• Entrance Test</li> <li>• Pre-Spud Meeting &amp; Considerations</li> <li>• Problem-solving Model</li> <li>• Hole Trends</li> <li>• Drill String Design</li> <li>• Simulator Training (Surf. #1, Horizontal, Swabbed-in Kick, Driller’s Method)</li> </ul>	<p><u>Daily Homework</u> Communication Drill String Design</p> <p><u>Bonus Homework (Due Day 8)</u> Operational W.C. &amp; Simulator Equipment 2</p>
<p><b>DAY TWO</b></p> <ul style="list-style-type: none"> <li>• Homework Review</li> <li>• Drillout Considerations – Casing Testing and BSEE Requirements</li> <li>• Leak Off and Formation Capability Tests</li> <li>• Well Control Principles</li> <li>• Kick Recognition</li> <li>• Shut In Methods</li> <li>• Methods of Well Control</li> <li>• Limitations To Control Capability               <ul style="list-style-type: none"> <li>– Kick Size</li> <li>– Shut In Method</li> <li>– Gas Percolation</li> <li>– Method of Reaching ICP</li> <li>– Stroke Fluctuation</li> <li>– Implementation of Driller’s Method</li> </ul> </li> <li>• Kill Sheet &amp; Simulator               <ul style="list-style-type: none"> <li>– Rig Math For Well Control, formulas and units</li> <li>– Kill Sheet for Simulator Problem #2</li> </ul> </li> <li>• Simulator Training (Simulator Problem #2, Wait &amp; Weight)</li> </ul>	<p><u>Daily Homework</u> Surface Kill Sheet (Surface students) Subsea Kill Sheet (SS students) Kill Sheet for Simulator Problem #3 Kill Sheet for Simulator Problem #4</p> <p><u>Bonus Homework (Due Day 8)</u> Operational W.C. &amp; Simulator Equipment 2</p>
<p><b>DAY THREE</b></p> <ul style="list-style-type: none"> <li>• Homework Review</li> <li>• General Mud Topics</li> <li>• Surface Hole – Top Hole Cleaning and Trends</li> <li>• BOP Equipment &amp; Accumulator Considerations</li> <li>• Well Control Problem Diagnosis and Solutions</li> <li>• Simulator Training (Simulator Problem #3, Driller’s Method)</li> </ul>	<p><u>Daily Homework</u> Mud Equipment 1</p> <p><u>Bonus Homework (Due Day 8)</u> Operational W.C. &amp; Simulator Equipment 2</p>
<p><b>DAY FOUR</b></p> <ul style="list-style-type: none"> <li>• Homework Review</li> <li>• Mud Solids</li> <li>• Lost Circulation in Top Hole – Causes &amp; Prevention</li> <li>• Deviation and Stuck Pipe</li> <li>• Simulator Training (Simulator Problem #4)</li> </ul>	<p><u>Daily Homework</u> Solids Stuck Pipe Top Hole Lost Circulation</p> <p><u>Bonus Homework (Due Day 8)</u> Operational W.C. &amp; Simulator Equipment 2</p>
<p><b>DAY FIVE</b></p> <ul style="list-style-type: none"> <li>• Homework Review</li> <li>• Difficult Well Control Situations – Lubricating, Stripping &amp; Snubbing</li> <li>• Well Under Control Video</li> <li>• Tripping Practices and Considerations</li> <li>• H2S and Safety</li> <li>• Simulator Testing</li> </ul>	<p><u>Daily Homework</u> Tripping H<sub>2</sub>S Well Control 1 Surface Gauge (all students) Subsea Gauge (SS students only)</p> <p><u>Bonus Homework (Due Day 8)</u> Operational W.C. &amp; Simulator Equipment 2</p>

## MDS Course Outlines

Operational Drilling Technology – Daily Outline (Week Two)	Homework Assignment
<p>DAY SIX</p> <ul style="list-style-type: none"> <li>• Homework Review</li> <li>• Causes of Abnormal Pressure</li> <li>• Well Control Red Flags &amp; Transition Zone Indicators</li> <li>• Diagnosing and Preventing Shale Problems</li> <li>• Wellhead Installation</li> <li>• Subsea Presentation</li> <li>• Casing &amp; Cementing</li> <li>• Simulator Testing</li> </ul>	<p><u>Daily Homework</u> Casing and Cementing Trend</p> <p><u>Bonus Homework (Due Day 8)</u> Operational W.C. &amp; Simulator Equipment 2</p>
<p>DAY SEVEN</p> <ul style="list-style-type: none"> <li>• Homework Review</li> <li>• Good Mud Practices</li> <li>• Logging and Perforating</li> <li>• Overview of Land and Subsea Presentation</li> <li>• Advanced Well Control, Part 1                             <ul style="list-style-type: none"> <li>– Shallow Gas &amp; Diverting</li> <li>– Shoe Pressures</li> <li>– Volumetric and Lubrication</li> </ul> </li> <li>– Modified Wait and Weight</li> <li>– Subsea BOP Considerations</li> <li>• Simulator Testing</li> </ul>	<p><u>Daily Homework</u> Well Control 2 Logging</p> <p><u>Bonus Homework (Due Day 8)</u> Operational W.C. &amp; Simulator Equipment 2</p>
<p>DAY EIGHT</p> <ul style="list-style-type: none"> <li>• Homework Review</li> <li>• Lost Circulation from Propagation Losses</li> <li>• Advanced Well Control, Part 2                             <ul style="list-style-type: none"> <li>– Managed Pressure Drilling</li> <li>– HPHT</li> <li>– Deviated Kill Sheets</li> <li>– Underground Blowouts &amp; Barite Plugs</li> </ul> </li> <li>• Bits</li> <li>• Differential Sticking &amp; Freeing Techniques</li> <li>• Kick Off Plugs</li> <li>• Well Control Review – BSEE regulations</li> <li>• IWCF Review</li> <li>• Simulator Training (Volumetric &amp; Lubrication)</li> </ul>	<p><u>Daily Homework</u> Freeing Technique Kick-Off Plug Well Control 3</p> <p><b>* <u>All Bonus Homework Due</u></b></p>
<p>DAY NINE</p> <ul style="list-style-type: none"> <li>• Homework Review</li> <li>• Gas Cap Introduction and Drill Stem Test Considerations</li> <li>• Gas Cap Drilling</li> <li>• Squeeze Cementing</li> <li>• Workover &amp; Completions</li> <li>• MDS Final Test</li> </ul>	<p><u>Daily Homework</u> Propagation &amp; Gas Cap Losses Workover &amp; Completions</p>
<p>DAY TEN</p> <ul style="list-style-type: none"> <li>• Homework Review</li> <li>• Well Control Testing (IADC &amp; IWCF)</li> <li>• Critiques, Diplomas, &amp; Individual Photos</li> </ul>	

## MDS Course Outlines

<b>Well Control – Level 2</b>		
<b>Day 1</b>	<b>Day 2</b>	<b>Day 3</b>
<ul style="list-style-type: none"> <li>• Introduction</li> <li>• Drilling Overview                             <ul style="list-style-type: none"> <li>– Types of Drilling Rigs</li> <li>– Why Well Control</li> </ul> </li> <li>• Pressure Basics                             <ul style="list-style-type: none"> <li>– Bottomhole Pressure</li> <li>– Drilling Fluids / Mud Gradient</li> <li>– Hydrostatic Pressure</li> <li>– Normal v. Abnormal Pressure Zones</li> <li>– U-Tube Principle</li> </ul> </li> <li>• Causes of Kicks                             <ul style="list-style-type: none"> <li>– Fluid Density</li> <li>– Tripping</li> <li>– Cementing</li> <li>– Lost Circulation</li> </ul> </li> <li>• Transition Zone Indicators / Kick Recognition</li> <li>• Gas Behavior / Shallow Gas</li> <li>• Leak-Off Tests</li> <li>• Limits to Control Capability</li> <li>• (Optional) Simulator Demo # 1</li> </ul>	<ul style="list-style-type: none"> <li>• Review Homework</li> <li>• Kill Sheet Instruction (Surface &amp; Subsea)</li> <li>• Kill Sheet Workshop</li> <li>• Well Control Principles</li> <li>• Well Control Methods                             <ul style="list-style-type: none"> <li>– Driller’s Method</li> <li>– Wait &amp; Weight Method</li> <li>– Volumetric Method</li> </ul> </li> <li>• Rig Circulating System</li> <li>• Drill String Basics</li> <li>• BOP Equipment (Surface &amp; Subsea)</li> <li>• BOP Design Considerations</li> </ul>	<ul style="list-style-type: none"> <li>• Review Homework</li> <li>• Subsea Considerations</li> <li>• (Optional) Simulator Demo #2</li> <li>• Certification Testing (IWCF / IADC)</li> </ul>
<b>Homework</b>	<b>Homework</b>	
<ul style="list-style-type: none"> <li>• Well Control Basics</li> <li>• IWCF Formulas</li> </ul>	<ul style="list-style-type: none"> <li>• Well Control Principles</li> <li>• Equipment</li> <li>• Subsea Kill Sheet</li> </ul>	

## MDS Course Outlines

<b>Well Control – Level 3 &amp; 4</b>	
<b>Daily Topics &amp; Activities</b>	<b>Homework Assignments</b>
<p><b>DAY ONE</b></p> <ul style="list-style-type: none"> <li>• Introduction</li> <li>• Basic Concepts (Hyrostatic Pressure, U-Tube, Gas Behavior, Friction Pressure, Constant BHP)</li> <li>• Basic Well Control Methods &amp; Determining Method</li> <li>• Abnormal Pressure</li> <li>• Transition Zone Indicators &amp; Kick Recognition</li> <li>• Shut-In Methods</li> <li>• Risk Management, Management of Change</li> <li>• Well Control Drills</li> <li>• Kill Sheets (Surface &amp; Subsea)</li> <li>• Simulator Exercises #1 &amp; #2</li> </ul>	<p><b>DAY ONE PREP WORK</b></p> <ul style="list-style-type: none"> <li>• Surface Kill Sheet – for Surface groups</li> <li>• Subsea Kill Sheet – for SS groups</li> <li>• U-Tube &amp; Shoe Pressure</li> <li>• Basic Well Control Methods</li> <li>• Abnormal Pressure &amp; Transition Zone</li> <li>• Kick Indicators</li> <li>• Shut-In Methods</li> <li>• Kill Sheet for Simulator Problem # 3 (in WC Chapter)</li> </ul>
<p><b>DAY TWO</b></p> <ul style="list-style-type: none"> <li>• LOT/PIT Considerations</li> <li>• Kick Size &amp; Kick Tolerance</li> <li>• Well Control Complications &amp; Gauge Limitations</li> <li>• Advanced Well Control Methods (Part 1): (Volumetric, Lube &amp; Bleed, Stripping)</li> <li>• Barriers</li> <li>• Casing Testing &amp; Negative Tests</li> <li>• Shallow Gas and Diverting</li> <li>• Simulator Exercise #3</li> </ul>	<p><b>DAY TWO PREP WORK</b></p> <ul style="list-style-type: none"> <li>• LOT, PIT, &amp; Kick Tolerance</li> <li>• Surface Gauge 1</li> <li>• Surface Gauge 2( IWCF only)</li> <li>• Well Control Problems</li> <li>• Barriers &amp; Regulations</li> <li>• Gas &amp; Shallow Gas</li> <li>• Subsea Gauge (subsea only)</li> <li>• Subsea (subsea only)</li> <li>• Kill Sheet for Simulator Problem #4 (in WC Chapter)</li> </ul>
<p><b>DAY THREE</b></p> <ul style="list-style-type: none"> <li>• BOP Equipment</li> <li>• General Mud Topics</li> <li>• Cementing Considerations</li> <li>• Well Control in Deviated Holes</li> <li>• Tripping Practices</li> <li>• Advanced Well Control (Part 2): Bullheading, reversing</li> <li>• Classroom Exercises</li> <li>• Simulator Exercise #4</li> </ul>	<p><b>DAY THREE PREP WORK</b></p> <ul style="list-style-type: none"> <li>• Equipment #1</li> <li>• Drilling Fluids &amp; Pit Management</li> <li>• Well Control in Deviated Holes</li> <li>• Tripping</li> <li>• Advanced Well Control Methods</li> <li>• Practice Exercise 1</li> <li>• Surface Accumulator (IWCF only)</li> <li>• Equipment 2 (IWCF only)</li> <li>• Subsea Accumulator (IWCF Subsea only)</li> <li>• Subsea Equipment (Subsea only)</li> </ul>
<p><b>DAY FOUR</b></p> <ul style="list-style-type: none"> <li>• Practical Simulator Assessments</li> <li>• Classroom Exercises</li> <li>• Testing - WellSharp (IADC)/IWCF</li> <li>• Well Control Certificates</li> <li>• Reviews &amp; Evaluations</li> </ul>	<p><b>DAY FOUR PREP WORK</b></p> <ul style="list-style-type: none"> <li>• Practice Exercise 2 (IWCF only)</li> <li>• Equipment 3 (IWCF only)</li> <li>• Workover &amp; Completions (if applicable)</li> <li>• Review for Test</li> </ul>

## MDS Course Outlines

### Stuck Pipe & Fishing Course Outline

#### DAY ONE

- Problem Solving Model
- Hole Trends
- Causes of Deviation Problems
- Differential Sticking - Fluid Spotting Techniques
- Freeing Technique Workshop
- Mechanical Sticking

#### DAY TWO

- Diagnosing and Preventing Shale Problems
  - Bentonitic Shale
  - Gumbo (Mud Making) Shale
  - Fracture Shale & Hole Stability
  - Plastic-Flow Shale & Squeezing Marl
  - Sloughing Shale
  - Heaving Shale
  - Caving Shale
- Hole Cleaning
- Stuck Pipe Workshop

#### DAY THREE

- Kick-Off Plugs
- Fishing Operations
- Fishing Tools
- Test

## Introduction To Drilling Course Outline

<b>Day One</b>	<b>Day Two</b>	<b>Day Three</b>
<ul style="list-style-type: none"><li>• Introduction</li><li>• History of Oil &amp; Gas Industry</li><li>• Industry Roles</li><li>• Geology Basics</li><li>• Pressure Basics</li><li>• Math Basics</li><li>• Drilling Fluid Basics</li><li>• Gas Basics</li><li>• Overview of Drilling Process</li><li>• Vertical &amp; Horizontal Wells</li></ul>	<ul style="list-style-type: none"><li>• Makin' Hole Video</li><li>• Drilling Exploration</li><li>• Drilling Personnel</li><li>• Drilling Equipment</li><li>• Circulation System</li><li>• Drill String &amp; Bit Basics</li><li>• Introduction to Well Control</li><li>• Well Control Equipment</li><li>• Communication &amp; Pre-Spud Meeting</li><li>• Drilling Surface Hole</li></ul>	<ul style="list-style-type: none"><li>• Tripping</li><li>• Cementing &amp; Casing</li><li>• Drillout Considerations</li><li>• Directional Drilling</li><li>• Problem Solving Model</li><li>• Drilling Problems</li><li>• Well Control Problems</li><li>• Well Control Principles</li><li>• Well Control Methods</li></ul>



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