

SW Cooling - Aft

E-Damp Close Shale Shakers Room Sup

Feedback fault

FS75

Pri 1

Pro

AFT

SW CO

13.1 °C

16.3 °C

13 °C

12 °C

12.6 °C

12.3 °C

19

12

AFT Central Cooling Port

12.5 °C

Coverboard

Engine Room No.3

HT Cool. Pump (E/R #3)

HT Cool. Pump (E/R #3)

LT Cool. Pump (E/R #3)

LT Cool. Pump (E/R #3)

12.1 °C

16.7 °C

29.5 psi

Thruster #5

No.2 F.O.P. Rm (S)

To No. 7 & 8 MDE Cooling

OPEN

CLOSE

No.1 F.O.P. Rm (S)

To No. 7 & 8 MDE Cooling

OPEN

CLOSE

Abnormal Both Valves in same position

NOTE: For DP3 Configuration These valves are normally in Auto Mode and only one valve open

Sequence status NOT ACTIVE

Active step:

Sequence Change Available

AFT Central Cooling Stbd

Port SW Cooling DutyStandby

SW Cooling Not active Stby not available

Auto On Auto Off

Stbd SW Cooling DutyStandby

SW Cooling No available Stby not available

Auto On Auto Off

1.9 psi 1.9 psi

Stby 2

SW Cool Pump 2 Stbd

54.3 psi 54.1 psi

Duty 1

SW Cool Pump 1 Port

4.4 psi 4.3 psi

Stby 2

SW Cool Pump 3 Stbd

3.2 psi 5.4 psi

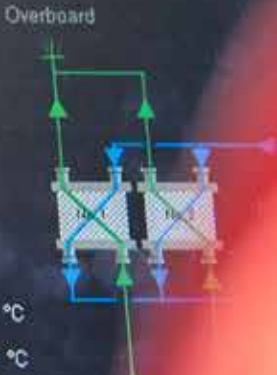
No missing variables



23 March 20

ssAlarm, Su F&G Normal

COOLING STBD AFT



WRITTEN BY SCOTT REDEPENNING
PHOTOGRAPHY BY CHRIS SHINN

The two highest priorities for every Diamond Offshore drilling operation are safety and performance. Attaining these two goals takes leadership, experience, discipline and decisiveness. But what about those rare qualities? Where are they attained? At Diamond Offshore, the starting point is in the Ocean Technology Center, better known as OTECH—30,000 square feet of the most sophisticated training methods and machinery in the industry.

TRAINING UP

AS DIAMOND OFFSHORE INVESTS BIG IN BUILDING CUTTING-EDGE NEW RIGS, THE COMPANY FOLLOWS SUIT IN ITS TRAINING DEPARTMENT BY OPENING OTECH, THE MOST ADVANCED EMPLOYEE DEVELOPMENT CENTER IN THE OFFSHORE INDUSTRY.



PETAR RADULOVIC
Director of Learning & Development

OTECH, which sits adjacent to Diamond Offshore headquarters in Houston, opened its doors in 2013. Before this date, in fact decades before this date, Diamond Offshore was already well known for having world-class training programs. But in recent years a lot had changed. Four new ultramodern drillships were ordered and built, as well as two new deepwater semisubmersibles and an ultra-deepwater dynamically positioned semi, adding to an already upgraded and updated fleet at the deeper depths. That's a lot of gleaming new iron hitting the high seas in a short time. Plus, these happen to be among the most technologically advanced drilling units on the planet. To properly work these rigs and deliver safety and performance,

more than a thousand crewmembers would require intense and comprehensive preparation. Diamond Offshore needed training programs that could live up to its new rig investments, and thus invested in building OTECH.

As Diamond Offshore's Director of Learning and Development, Petar Radulovic runs OTECH. He makes no attempt to conceal his pride for the impressive new facility, but says what isn't new is Diamond Offshore's modern approach to training. "OTECH was opened recently, but to really understand it you need to rewind about thirty years," he says. "The company's internal training program started in the early 1980s when they created

courses for well control and stability. They were responding to new needs in the industry back then, and that is what we are doing now with OTECH."

Radulovic says rig workers traditionally got most of their training on the job. Yes, they attended training courses along the way, but realistically most of the knowledge was gained working shifts far offshore. "Well, over the last seven years we got into this predicament where our company was changing quickly and we had to adapt," he says. "Our fleet was transitioning from older traditional rigs to the latest 6th-generation technology that requires a new operational skill set. These rigs are in demand now and we don't have time to wait for people



to learn on the job. So we invested in the training to keep the crews in step with the times. This allows us to keep executing at the levels Diamond Offshore is used to executing.”

Radulovic adds that there was one more major factor contributing to the need for OTECH, something he calls the generational crew change. “People with the most experience are exiting the industry slowly but surely. As they retire, there’s a huge experience gap to the people who will replace them. So we knew it was imperative to invest in a training facility like this to provide them with the experiences they would typically get on the job,” he says. “Here, in a week or two of training they can experience

what would take years and years of observation in the field. We can dial in the experience that somebody would gain over years in different parts of the world. At OTECH we can realistically simulate that.”

FROM BODY BUILDING TO BRAIN BUILDING

When Diamond Offshore makes a major investment in anything, be it a rig or a shorebase facility, the company usually looks for a way to be strategically and economically opportunistic. OTECH cost \$12 million to build out and equip, but the price tag could have been significantly higher. Instead of starting from scratch with a new building, the company looked to a

nearby structure that had good bones and an eager seller. In its past life, most of the OTECH building had been a Bally Total Fitness center. In fact, many Diamond Offshore employees were members. While some admit they were sad to see the weights, treadmills and elliptical machines go, all agree that replacing them with industry-leading facilities, technology and instruction was well worth it.

When clients tour the vast facility, they’re likely to see several of the center’s 17 simulators in action. There are three full-scale simulators, one full-scale, full-motion simulator, one desktop drilling simulator and 12 portable well control simulators, all of them state-of-

“UNLIKE TRADITIONAL COURSES, WITH THIS KIND OF TRAINING YOU DON’T GET TO MENTALLY CHECK OUT... YOU HAVE TO BE ENGAGED AT ALL TIMES BECAUSE YOU ARE OPERATING THE EQUIPMENT, AND YOU KNOW THAT SOMETHING TOUGH IS COMING.”

the-art. Two of the full-scale units can also be synched together to simulate dual-activity operations, a highly sought capability offered by the new drillships. Touring clients can also look in on an array of classrooms equipped with modern instructional technologies and retractable walls. The center’s interiors are sleek, contemporary and spotless. OTECH still has that new-building smell.

“We like to throw out our stats and show off the facilities,” says Radulovic. “But what is even more important are the people who benefit from OTECH. Last year we trained about 1,500 people here through 20 different courses taught by ten instructors. We train floor hands, derrick hands, assistant drillers, drillers, toolpushers, buoyancy control operators,

dynamic positioning operators, crane operators, chief mates, electricians. Really, almost anyone’s job can be taught and simulated here, and most Diamond Offshore crewmembers have to come through one to three times a year.”

Instructors still teach the basics at OTECH, such as well control, ballast control and stability. But according to Radulovic, the center’s abundance of advanced technology has allowed Diamond Offshore to usher in a new generation of learning, referred to as experiential training. “It’s not an instructor standing in front of a class just talking. Now the classes are almost completely simulation and then discussing the lessons learned during the simulation. We put our employees through an experience that really helps

the learning take root,” he says. “During simulation they get a variety of issues and challenges thrown at them, and they have to detect those issues and take care of them. They get to be successful, or not successful. If they are not successful, we correct the mistakes and do it again. If it’s successful, we talk about what made it so. It’s a new way of approaching that Drilling 101 type of knowledge.”

Radulovic says that when students are engrossed in a challenging experience, they have no choice but to learn. “Unlike traditional courses, with this kind of training you don’t get to mentally check out when you are dozing off after lunch. You have to be engaged at all times because you are operating the equipment, and you know that something tough is coming. There is always a complication

right around the corner. By the time they leave here each day, they are drained.”

OFFSHORE TAKEN INDOORS

Have a seat in one of OTECH’s full-scale simulators. The controls closely replicate those on Diamond Offshore’s new drillships. From the chair you are gazing out through windows exactly like those in the rig’s driller cabin, and the view is amazing. Nine laser-guided projectors stitch together a 3D world onto a 20’ x 40’ dome-shaped screen that surrounds the trainee in virtual rig reality. Look up, you see the derrick soaring above. Straight ahead is your drill string, complete with the up-and-down movement of the rig compensating for wave motion. Look to the left, you see the manifolds. To the right you can see the helideck. The other senses are engaged as well. You hear the sounds of a rig hard at work. You feel the vibrations of massive moving machinery. Really, the only thing missing is that unmistakable offshore rig smell.

Simulations also can be run to train crane operators, which is an important breakthrough for Diamond Offshore. Crane training has been around for many years, but it is typically done onshore with a real crane in a very controlled environment. This puts serious limitations on the training because instructors can’t expose the student to any failures. It’s just too dangerous. But in a simulation they can practice all the failures they want.

“We get to be in an offshore environment with all the elements—the wave motion, the wind, the lighting, day, night, snow, rain, fog—and we can change these parameters in the middle of the exercise. We can make a storm blow in,” says Radulovic. “We can cause failures of all kinds—failed slings, failed loads, failed mechanical components. All of the things that a traditional course would just talk about in terms of emergency response, we make our people experience it in a very real way and then we talk

about it. Plus we can record the simulation from multiple views. We can see the operator’s point of view, or what the lift looks like to the roustabout, or the supply boat’s view. You can’t do that in a regular brick and mortar school.”

In simulated training, realism is key. Students must be immersed to the point that they can apply the training without hesitation when they go offshore. But how real can OTECH really be?

Radulovic won’t try to convince you that they get very close. Instead he relays an anecdote. “Before we deployed on the full-scale simulators, we wanted to test them out with some of our most seasoned supervisors. We had several proof-of-concept sessions with these people, and a situation arose where one rig superintendent and one driller got into a heated exchange about what was happening in a particular simulation. At that point they were no longer sitting in the middle of Houston operating a bunch of computers. They were far offshore in the Gulf of Mexico dealing with a real problem, and they wanted to solve it correctly. At that point we knew the course was ready. If we can get somebody with that much experience that invested in an exercise, we know we have a good learning tool for people with much less experience. Simulation has big advantages, but only if it’s believable. If we don’t realistically replicate the offshore environment, then we’ve lost the student, because at that point it would just be a video game.”

To be certain, OTECH’s simulations aren’t created by computer geniuses working in a vacuum. They’re imported from offshore locations around the world. “Our simulations come straight from the expertise of the fleet,” says Radulovic. “Yes, students are in Houston, inside a building, but the experiences they are gaining come from real-world issues we’ve encountered offshore. Being that we are an internal training facility, we have the advantage of always having 30-plus rigs in the field that we can call and ask questions of, so

we can always improve our courses. We have about 3,000 people out there on rigs with knowledge that we can tap to make our product here very believable.”

THE HUMAN SIDE OF SIMULATION

Advanced technology is only the first step in realistic training. You also need advanced teachers. Senior Training Specialist Karl Shearer is one of the ten instructors at OTECH. He has taught well control to Diamond Offshore personnel for 18 years, and he’s quite pleased with his new workplace.

“We are no longer down a hallway on the first floor. We now have our own house, and it’s a big house. We have a lot more flexibility thanks to our space,” Shearer says. “The plain fact that we put in the best of the best simulators really speaks to how highly Diamond Offshore values training. We are the only company to have all of this technology in one place, which is great, but really our success comes back to a very human thing—the quality of the instruction. We all are specially trained in the teaching of adults, who learn very differently. For them it’s not about giving the answer, but patiently steering a student to find the answer for themselves.”

Shearer explains further. “We don’t just teach them what to do on the rig. We teach them why they do it. When there’s real understanding, there’s real learning. I need them to understand the concepts behind well control, because when they’re working offshore and see something they haven’t seen before, they will probably be able to make a very educated presumption about what to do.”

Every training session starts the same way a shift starts on a rig, with a pre-tour (pronounced “tower”) meeting. During the meeting trainees are responsible for obtaining the information needed to go to work, just like they would on the rig. They are told what has been going on prior to the shift, and what the plan is for their day. But the plan





invariably changes, and they have to demonstrate that they can deal with it correctly. Instructors will dial in the exercise to the student's knowledge level. If a student is struggling, instruction is kept basic until competency is achieved. If someone is already highly competent, it's a safe bet that the instructor will make the simulation tougher to reach for a higher level of learning.

OTECH student Douglas Rogers can attest to the depth of teaching here. He recently took the drilling practices course for his job as Assistant Driller on the *Ocean BlackHawk* and says he came away better prepared to handle issues in the real world. "The scenarios we run here could most definitely happen out there," he says. "They like to throw curveballs our way. Yesterday they actually had me scratching my head. For a minute there I went completely blank about what to do. But then you learn to take a step back, calm down, and go through your procedures to figure it out. I'm not going to lie, it's challenging. This is not a vacation to Houston. It's pretty intense all day long. Plus our hotel is

right across the street so we can get up and get right back to it first thing every day."

Rogers has been at Diamond Offshore for only a year, and while he's never seen anything like OTECH's high tech, he was most impressed with the people here, and that Diamond Offshore trains its own personnel rather than relying on third-party facilities common in the industry. "I like OTECH because it brings that family connection to training. When you come here, you are only with Diamond people and Diamond trainers. The same way that you become family with the guys on your rig, that family aspect also comes to the training room. I really like that. Having high technology is fine, but what I'm most interested in is working side by side with other Diamond Offshore personnel from other rigs and learning from each other."

GIVE THAT TRAINER AN OSCAR

In his day-to-day life, Karl Shearer is an affable guy. But when he puts on his training hat, something changes. He becomes unpredictable and even

downright devious, and the same goes for his fellow instructors. It is their job to feed students a steady diet of surprises and problems. As they see it, better here than out at sea with hundreds of lives at stake.

"We will get the guys familiar with the equipment where they think they know what's going on, and then we throw a wrench in the works to see how they will react to it," says Shearer. "The technology allows us to put them in situations that hopefully they will never experience on a rig, but if they do they can say, 'oh, I've seen this before. I know what's going on here. I can handle this because I've done it.' You can't train like this on the rig, because you can't put people in dangerous situations there. But here we can create all kinds of danger. And if they make the wrong decision, the only consequences are better learning."

To make these lessons as real as possible, OTECH trainers also cultivate another skill. Acting. When working a simulation, the trainee must communicate with various rig

personnel by phone, just as they would offshore. The instructor takes all the calls and plays all the roles. Using some of his best tried-and-true accents, Shearer explains, “So, say the crane operator needs to call the boat captain. Well, today that captain is a Canadian with a thick accent. Then he calls the company man, who happens to be from Australia. Then I have to be the driller, then a mud hand, then a roustabout, and everyone needs to sound different. I’ve noticed that the instructors have all developed their favorite voices for the roles.”

The instructor also has to know what level of knowledge is appropriate for each role. If Shearer is playing a superintendent, he will speak with authority and have higher-level information. A few minutes later he may be playing a roustabout with very little experience. In this case, if he tells the trainee that everything looks fine, the trainee better take that inexperience into account before believing that everything really is fine. “The key is to not give too much away,” says Shearer. “We feed a little information and then wait to see what they ask. If they ask the right

question, we give the answer. If it’s not the right question, we may give them something general or completely useless. This gets them thinking in the right direction, to dig deeper to solve the problem.”

Shearer says that sudden moment, when a lesson clicks into place in the mind of a student, is what he loves most about his job. “You know the cartoon where the guy gets the light bulb above his head. I get to see that light bulb come on in my students. As an instructor, that’s the best feeling in the world.” Shearer adds that it’s also gratifying to see people come back through as they advance in the company. “I taught a whole generation of roustabouts, and now they’re coming back to me as drillers and toolpushers, and they’re the future of the company. They’re going to be the OIMs and vice presidents. Who knows, I might have a future CEO on my hands right now.”

CLIENTS IN THE HOUSE

While training at OTECH is mandatory for Diamond Offshore employees, clients are invited and encouraged to take part as well. A number of them have

taken the company up on its offer. Hess, which holds the contracts for the *Ocean BlackLion* and *Ocean BlackRhino*, is sending two dozen of its own people to train at OTECH this year to prepare for operations aboard the two drillships.

This is a revolution, compared to how drilling campaigns are usually started. Conventionally, every contract between an operator and drilling contractor begins with a meeting that brings all participants together, including third-party service providers. The operator presents the well plan in detail so that everyone involved can become familiar with the objectives and potential hazards of the drilling campaign before the well is spudded. This pre-spud meeting is also known as “drilling the well on paper,” or DWOP. OTECH is making it possible for clients to engage in a much richer pre-spud meeting, in which DWOP is replaced by DWOS, or “drilling the well on simulator.”

Clients like Hess are taking advantage of the DWOS opportunities provided by OTECH, because the technology gives them much better insight and predictability for the upcoming wells,

says Petar Radulovic. “We get to replicate the operational challenges that the client is expecting, which helps us to think about the undertaking not just on paper, but in real life and real time. It helps us test out the well plan before we are out there spending money in the real world.

“OTECH is a premier facility that offers some of the most advanced training in our industry, but that’s only half the story,” Radulovic continues. “The other, and equally important, function is to build a strong relationship between our drilling crews and the operator personnel in charge of the project. Beyond training, this is also fantastic teambuilding. OTECH helps us achieve alignment with our clients in a controlled environment before we go offshore to work together.”

To that end, a special DWOS session has been designed that specifically replicates expected operations on the newly built *Ocean BlackLion*, which will be drilling its first well ever later this year in the Gulf of Mexico. This full-simulation model will consist of four exercises that will put Hess and Diamond Offshore rig personnel through challenges in well control, loss of circulation, stuck pipe and completions for the first well to be drilled. “Being able to preview potential problems is an enormous advantage,” says Radulovic. “The saying goes that perfect practice makes perfect. At OTECH we provide our crews and the operator personnel an environment where they can practice perfection.”

Radulovic adds that participation at OTECH allows clients to assess the quality of Diamond Offshore training firsthand, rather than just looking at a report. “They can see if we just talk the talk, or if we also walk the walk. And the only cost to them is that after the class we want to talk to them to see how we did.”

Clients also need assurance that training programs meet the requirements of industry governing bodies, such as the Coast Guard, Nautical Institute and

International Association of Drilling Contractors (IADC). According to Radulovic, OTECH delivers and then some. “Those accreditations take our training to a certified level, but then we take it farther, enhancing our courses to bring them up to Diamond’s own policies and standards. The first goal is to meet industry requirements, but we don’t want to just provide a certificate,” he says. “Ultimately, we want to make sure our people have the knowledge they need to provide outstanding service to our customers. When you pass one of our classes, you know much more than the fundamentals. You know specifically how Diamond Offshore does things.”

A RISING TIDE RAISES ALL RIGS

If OTECH is already the future of training, where does it go from here? Radulovic says his team is working on a training approach that reaches a higher level in the company—to Diamond Offshore’s top leaders. The leadership development program is bringing in people throughout the company who are responsible for managing others. Radulovic says this is a new frontier for offshore training.

“We are setting the tone for how to lead people. Up to this point everything has been focused on hard skills. We are now also focusing more intently on soft skills like leadership, business acumen, financial acumen and more. It’s important at all levels to understand the grand scheme of our business. This allows us to get out of our silos. The company only works if everything works.”

This new line of training was inspired by industries that have zero margins for failure, such as airlines, medical and nuclear. For years these industries have developed courses that focus on human resource management and the science of decision-making. “This type of training has never been part of our industry,” says Radulovic. “But we want to learn from these industries and apply what they’ve learned so we can avoid errors. We have to work at this as hard as they do, if not harder. This is the direction we are going.”

It all comes back to the two highest priorities—safety and performance. OTECH certainly gives Diamond Offshore an industry advantage in achieving these goals, but Radulovic says exclusivity isn’t the objective. He would like to see more facilities like this around the world because it’s good for everyone. “The more people in the industry who are well trained, the better. We’re all winners if we all go home safely,” he says. “We may be a step or two ahead of others in the industry, but this is part of a larger process. We are not in this alone. We want everyone to be successful. A failure of one company is a failure for the entire industry.”

Radulovic says that no matter what, the culture of intense training built over the last 30 years will always set the company apart. “Our people come here expecting a tough course every time. It’s never leisurely. You train all day, and then there are a few more hours of serious homework before you get to come in the next day and do it all again. We make sure that when they leave, they are better. It’s not good enough for us to just verify their knowledge. We have to improve on it.

“It’s especially important during more challenging times for the industry to not let anything slip,” Radulovic concludes. “We have to continue to stay polished and execute at the highest level. We want to give operators and society in general a high level of confidence in what we are doing. OTECH plays a big role in that. We make sure Diamond Offshore people are always performing at their best.”

