

Volume 1 Issue 3

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**BRANCH CHAIR'S MESSAGE - MICHAEL BRADSHAW**

It's great to be back in the saddle again! I am grateful to Laura Comstock for stepping in and taking the reins while I was distracted by the rebuilding of my home after it was heavily damaged by Hurricane Katrina. I am happy to say that we have completed the reconstruction and we have moved back in. Laura has served admirably for the past 8 months and she will be a tough act to follow, but I will do my best

The 2006 Professional Development Conference in Seattle in June was fantastic and set a new record for attendance. The Oil & Gas Branch sponsored one paper and presentation this year and we have submitted three proposals for next year's PDC in Orlando. When you prepare next year's budget, don't forget to budget for attendance at the 2007 PDC.

The Advisory Committee met at the PDC and the minutes of that meeting are posted on the website. It was a pleasure to finally meet many who I had only known through email or phone contacts. I look forward to meeting many others at next year's PDC.

In closing, many thanks to Lamar Hutchinson, our executive secretary for his hard work prior to and during the PDC.

Stay safe!  
**Michael Bradshaw, CSP, CHMM**



**ASSE Oil & Gas Branch Chair Michael Bradshaw**

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# *Fueling Ergonomics in the Oil and Gas Industry*

**By Cynthia L. Roth**

A company in the United Arab Emirates has recognized the importance of ergonomics as an integral component of EHS policies and practices.

The oil and gas industry has job requirements that are very labor-intensive, and if the employee is not regarded in the job design as well as the equipment and tools that are used, injuries and errors will occur.

Abu Dhabi National Oil Co. (ADNOC), located in United Arab Emirates (UAE), has established a code of practice known as Occupational Health and Risk Management - Ergonomic Factors, which is testament to the fact that ADNOC has recognized the importance of ergonomics as an integral component of EHS policies and practices.

ADNOC shareholders are demanding that guidelines be established to implement ergonomics in the workplace in order to bring the company in line with the top 5 percent of the world's leading oil and gas companies, and to be recognized as a world-class organization. During 2004, the first steps were taken to launch ergonomic awareness campaigns. These programs consist of two phases:

Phase 1 involves the development of an ergonomics awareness program. Ergonomic surveys are carried out at headquarter facilities, laboratories, shipping terminals and off-shore and on-shore operating sites. Ergonomic assessments of the sites are conducted and educational materials are developed and used to raise the awareness of ergonomics among employees across all the facilities.

Phase 2 of the ergonomics program will involve a far more extensive and detailed evaluation of all facilities to identify specific ergonomic exposures that may create the potential for human error and injury. Production may be impacted and a series of ergonomic solutions will be recommended for implementation to reduce or mitigate the pre-identified risk factors.

## *Industry Risks*

The oil and gas industry is a major source of revenues for most countries located in the Middle East and other regions worldwide. Whether it is a U.S.-based refinery and storage facility, or a research and recovery operation off the Niger Delta, the oil and gas industry has many built-in environmental, health and safety risk factors.

The work is performed in restricted spaces, open fields and other outdoor environments such as off-shore rigs and platforms. There are complications of heat, noise, slippery surfaces and a myriad of manual material handling exposures of lifting, lowering, carrying, pushing and pulling tasks. There are electrical issues and fall protection challenges, as well as repetitive tasks such as valve turning, which increases the force risks to the employees.

If ergonomics is not considered during any of the phases, production is affected and employees could be injured. Worker ergonomic and safety awareness is necessary for injury prevention during all phases of drilling operations.

At ADNOC, procedures and processes include ergonomics/safety meetings, ergonomic job assessments and general and task-specific training.

Certified professional ergonomists (CPEs) scientifically identified the apparent and non-apparent risk factors that exist in the working environment through objective measurement techniques and subjective quantification. Processes were devised to train the design engineers, supervisors, medical personnel and employees to identify risks and report through the appropriate system.

It is crucial that the recommendations are implemented and the corresponding feedback is monitored (i.e. injury records) on a continuous basis to ensure positive results, such as reduced injury levels and absenteeism and increased worker morale and productivity.

Some examples of possible ergonomic solutions for the oil and gas industry include:

- Use ergonomics in the designing of jobs and choose equipment and tools that are designed with ergonomics in mind.

- Establish ergonomics policies and procedures throughout the corporation, no matter what the size.
- Train workers in ergonomics for the appropriate handling and use of the special tools required during drill stem testing.
- Ensure all workers on the location understand the risks and dangers before starting any drill stem test. They should be fully informed of and trained in appropriate safety procedures, including the use of safety equipment and breathing apparatus.
- Utilize ergonomics for the design and layout of control rooms to eliminate human error and increase comfort, fit, user performance and functionality.
- Ensure all signage is placed in an area that everyone can see and read clearly. Use larger fonts and consider both indirect as well as direct glare.

### ***Why Ergonomics is Crucial***

The statistics for the oil and gas industry demonstrate claims by accident types. Ergonomics injuries fit into the categories titled "Overexertion," "Other" and "Bodily Reactions." They comprise the majority of accident types.

Approximately 54 percent of the claims relate to injured workers in the 25- to 44-year-old category, with males representing more than 95 percent of the claims in this category.

Working conditions in this industry vary significantly by occupation. Roustabout and other construction and extraction occupations may involve rugged outdoor work in remote areas in all kinds of weather. For these jobs, physical strength and stamina are necessary. This work involves standing for long periods, lifting moderately heavy objects and climbing and stooping to work with tools that often are oily and dirty.

Executives generally work in office settings, as do most administrators and clerical workers. Geologists, engineers and managers may split their time between the office and the jobsites, particularly while involved in exploration work.

Only one employee in 12 works fewer than 35 hours a week, because opportunities for part-time work are rare. In fact, a higher percentage of workers work overtime in this industry than in all industries combined.

The average non-supervisory worker worked 39.5 hours per week in 2002, compared with 33.9 hours for all non-supervisory workers on private non-farm payrolls.

Oil and gas well drilling and servicing can be hazardous. However, in 2002 the rate of work-related injury and illness in the oil and gas extraction industry, as a whole, was 3.4 per 100 full-time workers, somewhat lower than the 5.3 for the entire private sector. The rate for workers in the oil and gas field services segment, 4.5 per 100 full-time workers, was almost three times higher than that for workers in the crude petroleum and natural gas segment, which was 1.6. However, improvements in drilling technology and oil rig operations, such as remote-controlled drills, have led to fewer injuries.

Drilling rigs operate continuously. On land, drilling crews usually work 6 days for 8 hours a day and then have a few days off. In offshore operations, workers can work 14 days for 12 hours a day, and then have 14 days off. If the offshore rig is located far from the coast, drilling crew members live on ships anchored nearby or in facilities on the platform itself. Workers on offshore rigs always are evacuated in the event of a storm. Most workers in oil and gas well operations and maintenance or in natural gas processing work 8 hours a day, 5 days a week.

Many oilfield workers are away from home for weeks or months at a time. Exploration field personnel and drilling workers frequently move from place to place as work at a particular field is completed. In contrast, well operation and maintenance workers and natural gas processing workers usually remain in the same location for extended periods.

Because of the nature of the industry, promoting ergonomics can be a challenging, but necessary, endeavor.

### ***Occupational Risk Management***

Occupational risk management (ORM) is a combination of disciplines necessary to reduce fatalities and injuries in any working environment and increase the productivity, efficiency and quality of the work output. The disciplines included in ORM are ergonomics, health, safety and environmental management.

## ***PHMSA Issues Safety Advisory on Compressed Gas Cylinders***

**May 1, 2006**

DOT's Pipeline and Hazardous Materials Safety Administration (PHMSA) has issued a safety advisory notice about the manufacture, marking, and sale of certain high pressure DOT exemption cylinders that were not tested in accordance with applicable regulatory requirements. These cylinders were manufactured and/or distributed by Luxfer, Inc.

(Luxfer), Riverside, CA. Luxfer and its independent inspection agency, Arrowhead Industrial Services, Inc. PHMSA states that 6,325 high pressure cylinders manufactured to the DOT CFFC and FRP-1 standards as authorized in DOT-E 10915, DOT-E 9634, and DOT-E 9894, had been shipped from Luxfer without undergoing the required autofrettage and hydrostatic tests. In a joint effort, Luxfer and Arrowhead have retrieved 2,581 of the untested cylinders. The model numbers and serial numbers of the remaining 3,744 cylinders are listed in this notice. Only cylinders with the listed serial numbers listed are affected. PHMSA has said that a person with a listed cylinder should discontinue use of the cylinder and return it to Arrowhead so the autofrettage and hydrostatic test can be completed before its next use. Shippers and compressed gas filling facilities are advised that these cylinders do not meet the requirements of the Hazardous Materials Regulations and may not be offered for transportation or transported until the required testing is completed.

<http://a257.g.akamaitech.net/7/257/2422/01jan20061800/edocket.access.gpo.gov/2006/E6-6535.htm>

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## ***Fire-Retardant Clothing and DEET***

The general consensus and scientific information available indicates that the best repellent for insects remains products containing the chemical DEET. Most of the leading brands of insect repellent (Muskol, OFF, etc) contain DEET as the active product.

OSHAS 18001 is driving further awareness to the ORM model and will be adopted, forcing companies - on a worldwide basis - to incorporate all of the disciplines contained within this model. OSHAS 18001 has been developed to be compatible with the ISO 9001 (quality) and ISO 14001 (environmental) management systems standards, in order to facilitate the integration of quality, environmental and occupational health and safety management systems by organizations.

Competition is driving companies to remain competitive on a worldwide basis. Implementing ergonomic programs as part of ORM no longer can be ignored.

With the adoption of OSHAS 18001, companies must predict the future costs to society brought through a lack of ergonomic awareness. This will be displayed by increasing medical costs. In the United States, corporations are spending over \$60 billion annually for compensable injuries in every type of work environment. This can be reduced drastically by implementing an effective ergonomics program.

Design of work methodologies, tools and equipment must include specifications that enhance user capabilities and recognize the limitations humans develop as they age. If not considered, production, quality and human life will be at risk.

Investing in ergonomics will greatly enhance a corporation or public entity by building a better working environment. Most importantly, investing in ergonomics as an integral part of environmental, health and safety programs can save lives, prevent injuries, establish major cost benefits resulting in greater profits and better overall efficiencies, thereby creating an atmosphere of better business.

***“Each time someone stands up for an ideal, or acts to improve the lot of others, or strikes out against injustice, he sends forth a tiny ripple of hope.”***

***- Robert F. Kennedy***

We must be aware however that DEET is a flammable product (as are most of the propellants in the sprays) and these products should not be sprayed directly on to fire retardant clothing.

DEET is most effective when applied directly to any exposed skin and to skin to be exposed (ankles, wrists, neck). It is meant to work as a deterrent on the skin surface.

DEET must not be applied to fire retardant clothing. It will decrease the effectiveness of the FR similar to any other flammable contaminant. Laboratory tests on garments saturated with DEET showed a decrease in effectiveness similar to that when being contaminated with crude oil. A DEET saturated garment showed more after burn in tests than a non-contaminated garment and a 16 % increase in second degree burns (from the manikin test). Once the DEET is washed from the FR fabric, the fabric will still have its original fire retardant properties.

The solutions for this issue are two fold. First, instruct workers to apply DEET containing repellants directly to the skin and do not apply DEET onto clothing. Second, for added protection, products containing the insecticide 'Permethrin' (also known as Pyrethrum) are design for application to fabrics (tents, clothing) and can be applied to clothing. Permethrin is non flammable and in laboratory tests showed no detrimental effect on FR performance. A Permethrin treatment to clothing will remain effective for more than two weeks.

In field tests the combination of DEET on the skin and Permethrin on the clothing achieved a 99.9% effectiveness (less than one bite per hour over an eight hour shift).

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## *Regulatory Report*

DEPARTMENT OF THE INTERIOR

Minerals Management Service  
30 CFR Part 250 RIN 1010-AC57

Oil and Gas and Sulphur Operations in the Outer  
Continental Shelf  
Incident Reporting Requirements

This rule becomes effective on July 17, 2006

This final rule revises the MMS requirements for reporting incidents associated with the Outer Continental Shelf (OCS) oil and gas and sulphur operations. The revisions will clarify the requirements, and provide more precise definitions and reporting timeframes. This will result in a more consistent incident reporting program and the collection of more reliable incident information.

This regulation, applies only to lessees and operators on the OCS. The regulations require the lessees and operators to report all pertinent incidents, regardless of whose employees were involved. The rule allows reporting company to use its own format for the written report, or a form prepared for another agency, as long as the required information is included. You may submit written reports in whatever manner (mail, courier, personal delivery, fax, or e-mail) you choose. MMS may consider electronic submittal of information in future rulemaking. This rule does not require that any employee identification information be reported to MMS.

### **250.188 What incidents must be reported to MMS and when must they be reported?**

(a) You must report the following incidents to the District Manager immediately via oral communication, and provide a written follow-up report (hard copy or electronically transmitted) within 15 calendar days after the incident:

(1) All fatalities.

(2) All injuries that require the evacuation of the injured person(s) from the facility to shore or to another offshore facility.

(3) All losses of well control. "Loss of well control" means:

(i) Uncontrolled flow of formation or other fluids. The flow may be to an exposed formation (an underground blowout) or at the surface (a surface blowout):

(ii) Flow through a diverter; or

(iii) Uncontrolled flow resulting from a failure of surface equipment or procedures.

(4) All fires and explosions.

(5) All reportable releases of hydrogen sulfide (H<sub>2</sub>S) gas, as defined in 250.490 (1).

### **250.490 Hydrogen Sulfide**

(1) You must notify MMS without delay in the event a gas release which results in a 15 minute time-weighted average atmospheric concentration of H<sub>2</sub>S of 20 ppm or more anywhere on the OCS facility. You must report these gas releases to the District Manager immediately by oral communication, with a written follow-up report within 15 days.

(6) All collisions that result in property or equipment damage greater than \$25,000. "Collision" means that act of a moving vessel (including an aircraft) striking another vessel, or striking a stationary vessel or object (e.g., a boat striking a drilling rig or platform). "Property or equipment damage" means the cost of labor and material to restore all affected items to their condition before the damage, including, but not limited to, the OCS facility, a vessel, helicopter, or equipment. It does not include the cost of salvage, cleaning, gas-freeing, dry docking, or demurrage.

(7) All incidents involving structural damage to an OCS facility. "Structural damage" means damage severe enough so that operations on the facility cannot continue until repairs are made.

(8) All incidents involving crane or personnel/material handling operations.

(9) All incidents that damage or disable safety systems or equipment (including firefighting systems).

(b) You must provide a written report of the following incidents to the District manager within 15 calendar days after the incident:

(1) Any injuries that result in one or more days away from work or one or more days on restricted work or job transfer. One or more days means the injured person was not able to return to work or to all of their normal duties the day after the injury occurred.

(2) All gas releases that initiate equipment or process shutdown.

(3) All incidents that require operations personnel on the facility to muster for evacuation for reasons not related to weather or drills.

(4) All other incidents, not listed in paragraph (a) of this sections, resulting in property or equipment damage greater than \$ 25,000.

### **250.189 Reporting requirements for incidents requiring immediate notification.**

For an incident requiring immediate notification under 250.188(a), you must notify the District Manager via oral communication immediately after aiding the injured and stabilizing the situation. Your oral communication must provide the following information:

- (a) Date and time of occurrence;
- (b) Operator, and operator representative's name and telephone number;
- (c) Contractor and contractor representative's name and telephone number (if a contractor is involved in the incident or injury/fatality);
- (d) Lease number, OCS area, and block;
- (e) Platform/facility name and number, or pipeline segment number;
- (f) Type of incident or injury/fatality;
- (g) Operation or activity at time of incident (i.e., drilling, production, workover, completion, pipeline, crane, etc.); and
- (h) Description of the incident, damage, or injury/fatality.

### **250.190 Reporting requirements for incidents requiring written notification.**

(a) For any incident covered under 250.188, you must submit a written report within 15 calendar days after the incident to the District Manager. The report must contain the following information:

- (1) Date and time of occurrence;
- (2) Operator, and operator representative's name and telephone number;
- (3) Contractor and contractor representative's name and telephone number (if a contractor is involved in the incident or injury);
- (4) Lease number, OCS area and block;
- (5) Platform/facility name and number, or pipeline segment number;
- (6) Type of incident or injury;
- (7) Operation or activity at time of incident (i.e., drilling, production, workover, completion, pipeline, crane etc.);
- (8) Description of incident, damage, or injury (including days away from work, restricted work or job transfer), and any corrective action taken; and
- (9) Property or equipment damage estimate (in U.S. dollars)

(b) You may submit a report or form prepared for another agency in lieu of the written report required by this paragraph (a) of this section, provided the report or form contains all required information.

(c) The District Manager may require you to submit additional information about an incident on a case-by-case basis.

*-Submitted by Phillip Perry*

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## *CSB Releases BP Texas City Trailer Blast Info*

### **From CSB -**

Washington, DC, June 30, 2006 - The U.S. Chemical Safety Board (CSB) announced it is releasing detailed trailer blast damage information developed during the ongoing investigation of the March 23, 2005, explosions at the BP refinery in Texas City, Texas. The information was posted to the agency's website, CSB.gov, and also provided to the American Petroleum Institute (API), the trade organization that is working to develop new guidance on the safe placement of trailers and similar temporary structures used in the oil and chemical industry.

The accident at BP killed 15 workers and injured about 180 others when flammable liquid and vapor overflowed a blowdown drum during the startup of the refinery's isomerization unit. All of the fatalities and many of the injuries occurred in and around trailers that had been positioned near the isomerization unit to support maintenance activities on adjacent refinery units.

The data released today include details of the injuries and structural damage that occurred among some 44 different trailers that were located in the vicinity of the isomerization unit. The fifteen fatalities occurred in or near two trailers that were located 121 to 136 feet from the blowdown drum. Occupants were injured in trailers as far away as 479 feet from the drum. Damage was noted in trailers almost 1000 feet away.

On October 25, 2005, the CSB issued an urgent recommendation to the API to develop new industry guidance 'to ensure the safe placement of occupied trailers and similar temporary structures away from

hazardous areas of process plants.' The API announced it would begin work on the new guidance and convened a committee of industry representatives that has since met several times.

The Board's urgent safety recommendation called on the industry to establish minimum safe distances for trailers away from hazardous process areas. The CSB noted that, for reasons of convenience, trailers are often placed close to refinery units during maintenance activities. Unlike permanent structures such as control rooms, trailers can easily be relocated to safer positions.

'The information we made public today underscores just how vulnerable trailers are to serious blast damage. Placing trailers where there is a risk of explosion poses an unacceptable risk to occupants,' said Board Member John S. Bresland. 'At a distance of 597 feet from the source of the flammable vapor, the roof of one trailer collapsed and its walls were heavily damaged. Modest explosion overpressures that would cause no significant harm to a modern blast-resistant refinery control room can devastate a trailer.'

'We are providing our findings to the American Petroleum Institute to help expedite the development of new guidance that is based on the best available science and provides adequate protection for industry workers,' Mr. Bresland stated.

Following the tragic accident in March 2005, BP developed a new corporate trailer siting policy that provides exclusion zones for areas where explosions are possible. The BP policy states that all occupied trailers should be located outside of vulnerable areas even if this means a location outside the site boundary. A large number of Texas City personnel were relocated to a permanent building away from the refinery.

Board investigators issued preliminary findings about the accident at a public meeting in Texas City on October 27, 2005. The Board's final report on the root causes of the accident at BP is expected to be released before the end of the year.

# Online Oil & Gas Industry Safety Resources

- \* **American Petroleum Institute: Environmental Health & Safety**  
The API's environment, health and safety activities and programs support the petroleum industry through research, standards development, training, information transfer and advocacy
- \* **Canadian Petroleum Safety Council**  
Promoting health and safety in the Canadian petroleum industry
- \* **A Step Change in Safety**  
A cross-industry initiative of the UK oil and gas industry
- \* **Fire and Blast Information Group**  
FABIG is an organization committed to improving safety on offshore installations through the development and sharing of expert knowledge on hydrocarbon fires
- \* **Offshore Petroleum Safety**  
Information from the Australian Industry Science Resources site
- \* **OSHA Oil and Gas Well Drilling and Servicing**  
Part of OSHA's commitment to provide employers and oil and gas workers with information and assistance to help in complying with OSHA and industry standards to ensure a safe workplace
- \* **WorksafeBC Health & Safety Centre for Petroleum**  
Online resource for workplace injury prevention information for the oil and gas industry
- \* **Petroleum Industry's Annual Safety Seminar**  
The forum for petroleum industry safety technology and management philosophy

# International Regulators Forum (IRF)

The IRF is comprised of regulatory agencies with responsibilities for offshore facility safety. The first meeting was held in Houston in 1994, and annual meetings have been held subsequently. In addition to the organizing event, MMS has hosted three other meetings - one in Houston, one in the Washington area, and one in Santa Barbara. Currently, representatives from the U.S., the U.K., Brazil, Norway, Canada, the Netherlands, Australia, and New Zealand participate in the IRF. Participants share information on technological advances, safety issues, accident investigations, regulatory policies, international standards and conventions, performance measurement, and research. Members may also exchange personnel, and establish reciprocal agreements.

## *Ongoing projects*

\*International Regulators Conference - 79 nations have ongoing or proposed offshore oil and gas operations. These nations could benefit from the experiences of other regulators and the sharing of accident data, standards, performance measures, and procedures. Consistent procedures would facilitate international commerce and could significantly reduce operating costs. The first such conference, organized by the IRF, will be held from March 30 to April 1, 2005, in London.

\*International Safety Award - Recognize outstanding safety performance internationally. The first awards, named after former MMS Associate Director Carolita Kallaur, will be presented at the London conference on March 31.

\*Cooperation on Standards: Share resources in monitoring international standards activities.

\*International Incident Data and Performance Measures: Develop a common set of measures. Develop a common incident database. The IRF has reached agreement on a common set of definitions and measures that will allow us to compare the frequency of accidents from region to region

\*Personnel Exchange: Participate in ongoing personnel exchanges as funds permit. Also, at the request of an IRF member, other IRF agencies have participated in short-term projects to assess regulatory or safety concerns.

\*Material Handling and Mechanization of Drilling Rigs: Assess crane safety issues and the need for common policies. Assess the need for international requirements for automated pipe-handling equipment and other worker safety measures. This important effort will lead to common crane safety policies and has drawn worldwide attention to crane and materials handling issues.

\*Cooperate on other safety and pollution prevention matters.

The following countries participate in the IRF:

- Australia
- Brazil
- Canada
- Netherlands
- New Zealand
- Norway
- United Kingdom
- United States

The MMS has joined with regulators who form the International Regulators Forum to organize a [major conference for the regulators](#) of all coastal states with an interest in offshore oil and gas development in Miami in December 2007. The purpose of the conference is to share experiences and to compare differences in regulatory approach and safety performance.

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The International Regulators Forum prepared a [report that examines the worldwide picture on off-shore lifting and mechanical lifting issues](#) and reviews national initiatives to share best practices in order to improve effectiveness in regulating these risks. (03/17/2005)

## Contraband Containers

Here's something more for those of you with security duties to keep an eye out for. The water bottle has a hidden compartment that could be used to smuggle contraband into and out of your facilities. The bottom of the bottle unscrews revealing the concealed compartment. My understanding is the bottles can be purchased commercially at novelty stores such as Spencer's Gifts and e-bay.



***“Twenty years from now you will be more disappointed by the things you didn't do than by the ones you did do. So throw off the bowlines. Sail away from the safe harbor. Catch the trade winds in your sails. Explore. Dream. Discover.”***

***-Mark Twain***



U.S. Coast Guard  
**Safety Alert**



May 10, 2006 Alert 4-06 Washington, DC

**RECALL - PAINS WESSEX WHITE COLLISION  
WARNING (MK7) HAND FLARE - ITEM NO  
52651**

The U.S. Coast Guard has recently learned that Pains Wessex, a United Kingdom company, has announced a recall of its White Collision Warning (MK7) Hand Flares Item No. 52651. The recall follows a recent incident in which an individual was seriously injured while using the White Hand Flare. The company has identified that there may be a risk of misfire and is recalling all white flares to prevent further injury.

The White Hand Flare is sold on its own, as a part of the Collision Warn-Off Kit, or in the ORC RORC

Distress Kit as shown in the images below.



Customers with unexpired White Hand Flares are requested not to use the flare and to return it immediately to the place of purchase for a full refund. Those having questions may call +44(0)2392 623962 during office hours or contact the company via email at recall@pwss.com. Persons with expired White Hand Flares should call +44(0)2392 623965.

Distributors having existing stock, should contact Keith Bradford at Pains Wessex on +44(0)2392 623912 or e-mail keithbradford@pwss.com for collection, replacement with Comet Handflare or reimbursement.

No other Pains Wessex products are being recalled. Pains Wessex, Australia Aurora

White Hand Flares are not affected.

The U.S. Coast Guard strongly recommends that all vessel owners and operators who have this equipment onboard their vessels follow the recommendations per the Pains Wessex recall notice. Additional information is available at <http://www.mcmurdo.co.uk/>.

Questions or comments regarding this safety alert may be addressed to Ms. Alexandra Kim of the U.S. Coast Guard Headquarters Lifesaving and Fire Safety Standards Division at (202) 372-1394 or Akim@comdt.uscg.mil. This safety alert is provided for information purposes only and does not relieve any domestic or international safety, operational or material requirement.

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Released by: Office of Investigations and Analysis <http://marineinvestigations.us>  
To subscribe: kolsen@comdt.uscg.mil



**Do you have an article  
you would like to submit?  
Contact Michael Bradshaw at  
mbradshaw@danos.com or  
985-693-8574.**

## ***HSE Safety Alert***

### **Catastrophic failure of shell and tube production cooler**

- Safety alert: 01/2006
- Issue date: May 2006

#### ***Introduction***

1. A recent serious incident occurred that involved the catastrophic failure of a shell and tube heat exchanger, and there is a potential risk of failure to heat exchangers of the same, or similar, design. This notice describes the incident and outlines the action that should be taken by duty holders.

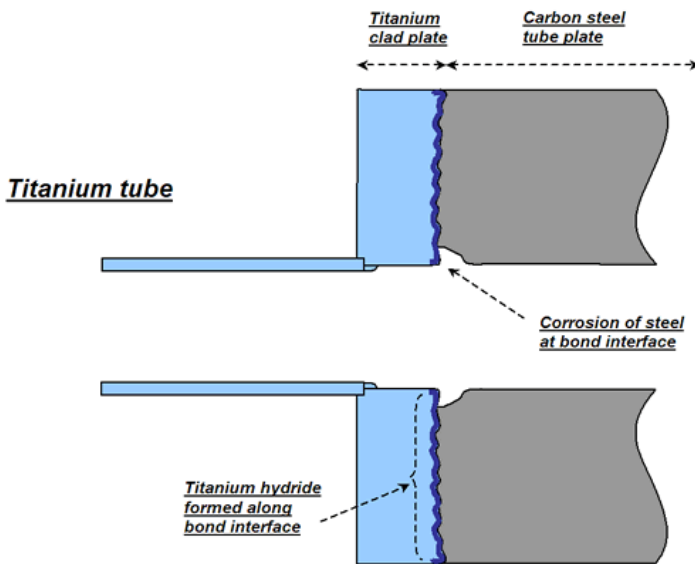
#### ***Background***

2. The incident on an offshore gas production platform occurred when a shell and tube production cooler suffered a catastrophic failure. Seawater was being used to cool High Pressure (HP) hydrocarbon gas. The shell, tubes and titanium cladding sheet were torn from the steel tube sheet and propelled across the deck with sufficient force to rupture an adjacent exchanger. The cooling water pipework and vent pipework were torn off the shell and the tube sheet and channel end were ripped off the supports. There was a significant and immediate gas release followed by ignition and an explosion. Fortunately there were only two relatively minor injuries, but under slightly different circumstances there could have been significantly more serious casualties.

### Heat exchanger information

3. The heat exchanger operates with sea water on the shell side and HP hydrocarbon gas plus condensates and water on the tube side. The tube sheet had been manufactured from carbon steel with an explosively bonded, 13mm thick titanium cladding plate on the sea water side to provide corrosion protection. A key feature of this design is that it allows the HP hydrocarbon gas, condensates and water to come into contact with the steel tube sheet/titanium interface, thus creating the potential for in-service degradation mechanisms as detailed in paragraph 4 below.

### Tube to Tube sheet and Titanium cladding to Steel tube sheet interface detail.



### Reasons for failure

4. Based on the results of an ongoing forensic investigation, the current evidence suggests the following sequence of events:

- That the explosively formed bond between the titanium cladding and the tube sheet was fit for purpose at the time of manufacture.
- It is probable that liquid in the process stream led to galvanic corrosion of the steel tube sheet at the intersection of the tube holes and the steel/titanium interface (bond interface).
- Hydrogen released by the corrosion process had reacted with the titanium and resulted in the progressive formation of brittle titanium hydrides at the bond interface.
- The growth of titanium hydrides weakened the bond interface sufficiently to cause a sudden, dynamic failure of the bond.

- Failure of the bond resulted in rapid pressurization of the bond interface, complete separation of the titanium cladding plate from the steel tube sheet, followed by over pressurization of the shell and catastrophic failure of the cooler.

### Action required

5. HSE considers that the emerging findings of this investigation are significant enough to require immediate action by duty holders in the light of the sudden and possibly catastrophic nature of this type of heat exchanger failure. Therefore, duty holders should:

- Identify whether they have any heat exchangers manufactured to the same design or to a similar design incorporating this type of steel-titanium interface.
- In the light of this notice, undertake a risk assessment of the continuing use of any heat exchangers so identified, in collaboration with the plant manufacturer (if still in business) and/or third party verifiers and other specialist advisers.
- Implement any remedial actions in the light of the risk assessment

### Further Information

Any queries relating to this notice should be addressed to:

Team Leader - OSD3.4 Mechanical Systems  
Health and Safety Executive  
Hazardous Installations Directorate  
Offshore Division  
5N.2 Redgrave Court  
Merton Road  
Bootle  
Merseyside L20 7HS

Tel: 0151 951 4036

This guidance is issued by the Health and Safety Executive. Following the guidance is not compulsory and you are free to take other action. But if you do follow the guidance you will normally be doing enough to comply with the law. Health and safety inspectors seek to secure compliance with the law and may refer to this guidance as illustrating good practice.

# *Moving Towards High-Level Injury Prevention in the Oilfield*

Overall, the Petroleum industry has made significant strides in safety performance. This is in large part due to the commitment given by companies, who realize the costs and potential public attention that comes with employees and contractors engaged in potentially high-risk-potential work.

Quite a turnaround from not-so-long-ago where an upstream operator who had all his fingers was the exception, rather than the norm.

But, even with this high expectation of Safety, injuries to workers and contractors continue to be prevalent - both upstream and downstream.

Often, workers are inescapably exposed to the elements, in uncontrollable environments, which can lead to loss of footing, slippery handling or hampered vision; in our experience, "traditional" engineering-out ergonomic fixes are limited in the oil industry. Operators frequently lift heavy and often awkward loads (iron, chicsans) or maneuver large wrenches and other tools. And when team lifting is required, there is ample risk of miscoordination. Cranking stuck or wide valves can be a challenge both upstream and downstream. In addition, workers often have to run obstacles courses, crossing iron-strewn surfaces and wellsites. All while working long hours with high standards of performance.

These factors contribute to predominant oil industry injuries - strains/sprains, slips/trips/falls and hand injuries. But personal worker safety can be taken to a higher level with the right strategy and methods. - can be prevented by placing individual operators in control of their own safety, effectively "injury-proofing" them to the highest degree possible by providing each with the critical skills needed for boosting their own safety.

Here are some keys to next-level safety performance:

- \* Develop mental skills of awareness of unseen or taken-for-granted exposures (e.g. adjust to the first step when crossing different surfaces, each of whose "border areas" has a differing level of friction), judgment, simple team signals (verbal or eye contact) to initiate lifts, tangible methods for attention control (e.g.

eye-hand coordination methods critical to preventing hand injuries), heightening a mindset of personal control for own actions - at work and at home, perspective on making small changes in an ongoing manner to maximize safe actions, rather than only looking to avoid most-risky scenarios.

- \* Transfer physical skillsets for plateau breakthrough injury prevention, including: heightening balance - essential to soft tissue and hand safety as well as to slip/trip/fall prevention, maximizing usable strength through best use of personal leverage, elevating positional awareness, transferring forces away from body areas (e.g. lower back, wrists, shoulders, neck, knees) that might otherwise accumulate wear-down tension - and more (e.g. breath control as employed by certain martial arts adepts and weightlifters to reduce tension and focus forceful efforts).
- \* Focus on industry-specific applications, for example, lifting a chicsan off the ground, rather than a cardboard box from a breakroom floor.
- \* Build leadership and cultural change through encouraging default/background safety habits, even where workers are minimally supervised or observed. Aim for operators becoming more receptive to change and learning, as well as developing the confidence that personal skill improvement is readily doable.
- \* Make safety interventions and training interesting and exciting both by making these highly participative and by showing applications to favored off-work hobbies and activities (e.g. golf, hunting, fishing, etc).

Working in the oil and gas industry has unique exposures and conditions. But a practical strategic approach can break through plateaus of injuries for high level safety culture and performance.

**-submitted by Robert Pater**

# 2006 SAFE (Safety Award for Excellence) Finalists

The MMS presented the first Safety Award for Excellence in January 1983. This award recognizes and commends companies that expend extra effort to conduct operations in a safe and pollution-free manner by adhering to all regulations, employing trained and motivated personnel, and going the extra mile to enhance safety and environmental protection. The objectives of the program are to:

- \* Elevate awareness of safety and pollution prevention.
- \* Encourage voluntary compliance.
- \* Provide the public with better understanding of the professionalism of the Outer Continental Shelf (OCS) operators.
- \* Encourage excellence in safety and pollution prevention.
- \* Demonstrate that safe practices enhance protection of personnel.

The MMS selects a maximum of five finalists in each of four categories. The 2005 winners are photographed below with, on the left, Johnnie Burton and Lynn Scarlett. Ms. Burton is the MMS Director and is currently serving as the Assistant Secretary for Land and Minerals. Ms. Scarlett is the Acting Secretary of the Department of the Interior. Click on the photos for an enlarged view.

## Moderate OCS Activity Winner



**Nexen Petroleum USA, Inc.  
Larry McRae**

## Drilling Contractor Winner



**TODCO  
Mike Kelly & Peter Bridle**

## High OCS Activity Winner



**Newfield Exploration Company  
Gary Harrington**

## Production Contractor



**Baker Energy  
Donald Fusilli, Jr.**

# Finalists

The finalists in each category below are photographed with Tom Readinger, MMS's Associate Director for Offshore Minerals Management. Click on the photos for a larger view.

## High OCS Activity Finalists

**Chevron USA, Inc.**  
Melody Meyer



**Exxon Mobil Corporation**  
Kok-Yew See



**Newfield Exploration Company - Winner!**  
Gary Harrington



**Shell Exploration & Production Co.**  
Frank Glaviano, Sr.



## Moderate OCS Activity Finalists

**Anglo-Suisse Offshore Partners, LLC**  
Brady Lotridge



**Eni Petroleum Company, Inc.**  
William Dooley



**EOG Resources, Inc.**  
Ken Roy



**Marlin Energy LLC**  
Clint Credeur



**Nexen Petroleum USA Inc. - Winner!**  
Larry McRae



**Seneca Resources Corporation**  
Barry McMahan



## Drilling Contractor

**EnSCO International, Inc.**  
Keith Bullard



**Rowan Drilling Company, Inc.**  
David Russell



**TODCO - Winner!**  
Mike Kelly  
Peter Bridle



## Production Contractor

**Baker Energy - Winner!**  
**Donald P. Fusilli, Jr.**



**C&D Production Specialist**  
**Dimples Crosby**



**Wood Group Production Services,  
Inc.**  
**Rod Prinsep**



*“It is not the critic who counts, nor the man who points out how the strong man stumbled, or where the doer of deeds could have done them better. The credit belongs to the man who is actually in the arena, whose face is marred by dust and sweat and blood; who strives valiantly; who errs and comes short again and again; who knows great enthusiasms, great devotions; who spends himself in a worthy cause; who, at the best, knows in the end the triumph of high achievement, and who, at the worst, if he fails, at least fails while daring greatly, so that his place shall never be with those timid souls who know neither victory nor defeat.”*

*- Theodore Roosevelt*

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