



Industry Perforating Safety Forum

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Perforating – onshore Americas



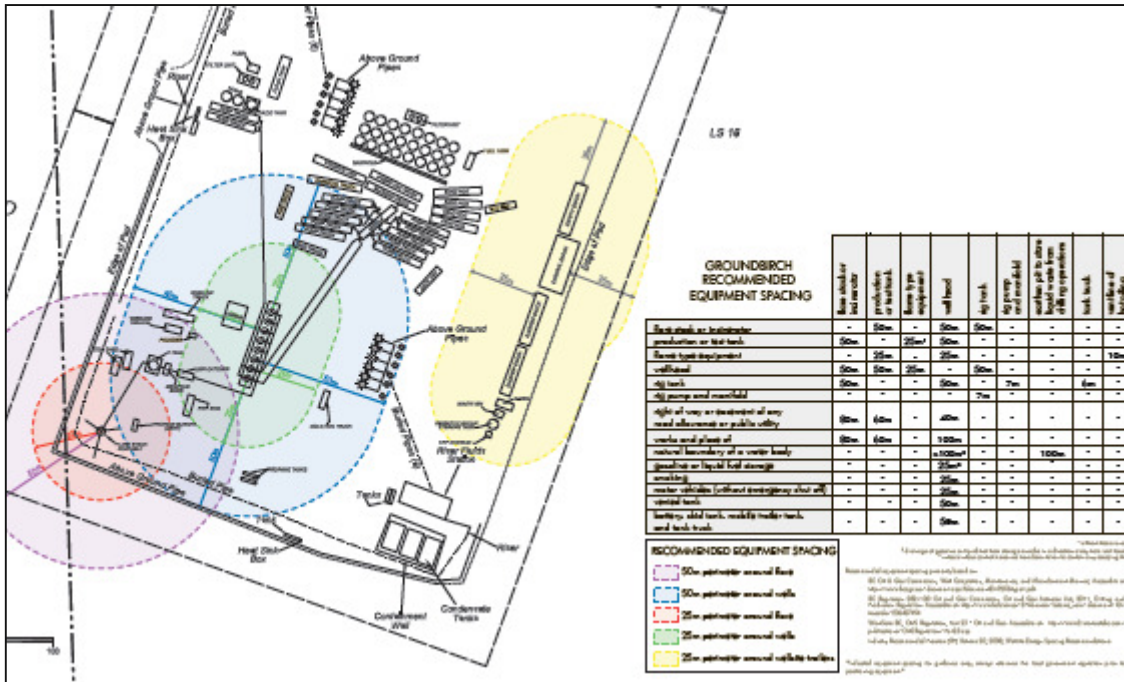
- Perforating is part of our daily business in the Americas - Multiple vendors
- The “shale revolution” has dramatically increased oilfield activity onshore North America. Pressure on
- If we can’t perforate safely & efficiently, we don’t have a business
- How does industry ensure sufficient training and standards, with respect to explosives and Well control?

Simultaneous operations

The land business has changed....
Simops are the norm
The wellsite has become a manufacturing site
More people, tight spacing, multiple vendors and operations

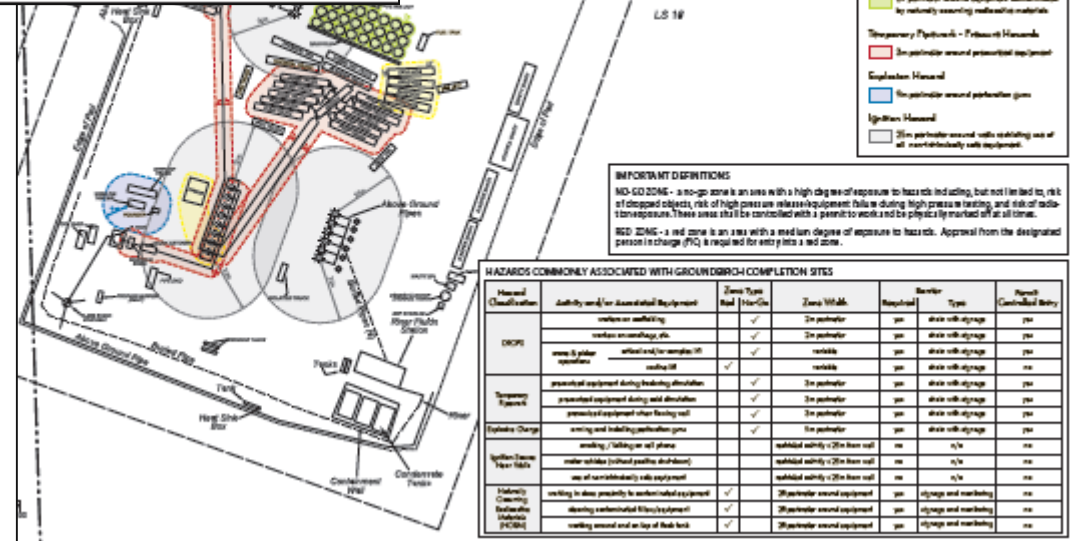


Hazardous zones and equipment spacing

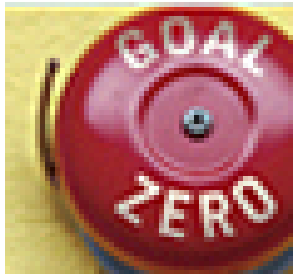


- Equipment spacing
 - Regulatory requirements (sometimes)
 - Industry recommended practices
 - Internal HAZOP exercises

- Hazardous zones
 - Dropped objects
 - Temporary pipework/pressure
 - Explosion hazard
 - Ignition hazard
 - NORMs



Shell's approach to safety



Goal Zero - vision of 'no harm to people' if we all take individual responsibility for our actions.

- Coupled with our expected **Golden Rules** (Comply, Intervene & Respect)

- and the **Lifesaving Rules**

are key tools in achieving a workplace without harm.

Shells Safety Habits - Process and Personal safety

- The safety goal of the Shell Wells organisation is for no harm to people and protection of the environment – Goal Zero on personal and process safety.
- Process safety is the management of hazards that can give rise to major accidents involving release of potentially dangerous materials, release of energy (such as fire or explosion) or both. In Wells, particular focus is given to wellbore integrity management, which in simple terms is about keeping the hydrocarbons in the pipe, the well or the reservoir.

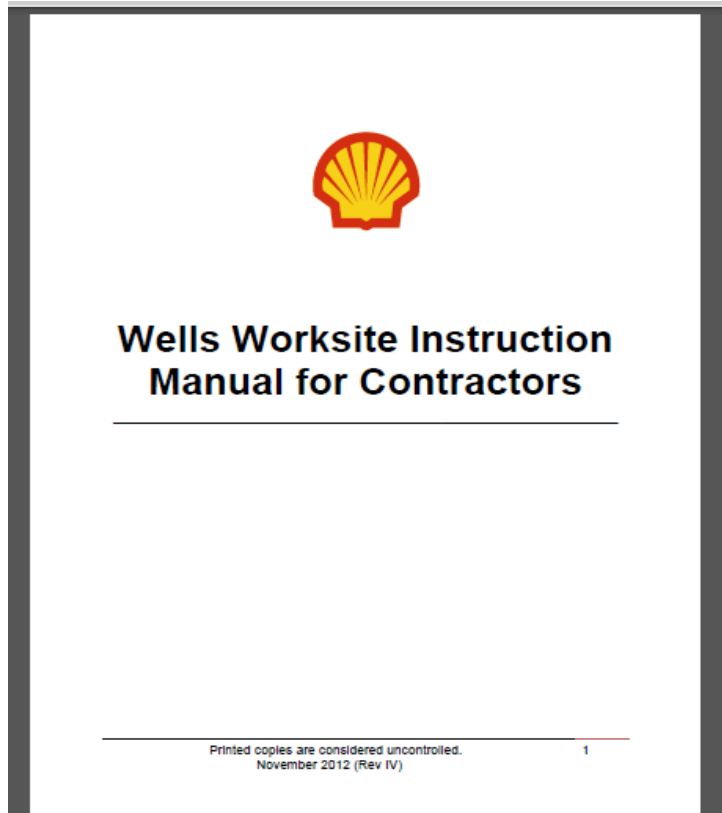
Think Process Safety – 10 critical elements



1. Know your physical wells BARRIERS and confirm they are tested.
2. If a BARRIER is LOST, immediately STOP and fix it.
3. Know your WELL CONTROL EQUIPMENT and confirm it's certified and tested.
4. Confirm all PEOPLE are trained and competent for the task.
5. Perform RISK ASSESSMENTS during planning and for changes.
6. Follow STANDARDS and PROCEDURES or get approval to deviate.
7. *'WALK THE LINE' on temporary rig-ups and confirm that the installation is in accordance with the plan shown on the layout drawing.*
8. Test your EMERGENCY RESPONSES and conduct regular drills.
9. Know and communicate SUBSURFACE UNCERTAINTIES.
10. REPORT Wells process safety incidents – investigate, share, learn.

Contractor safety

- www.uacontractor.com



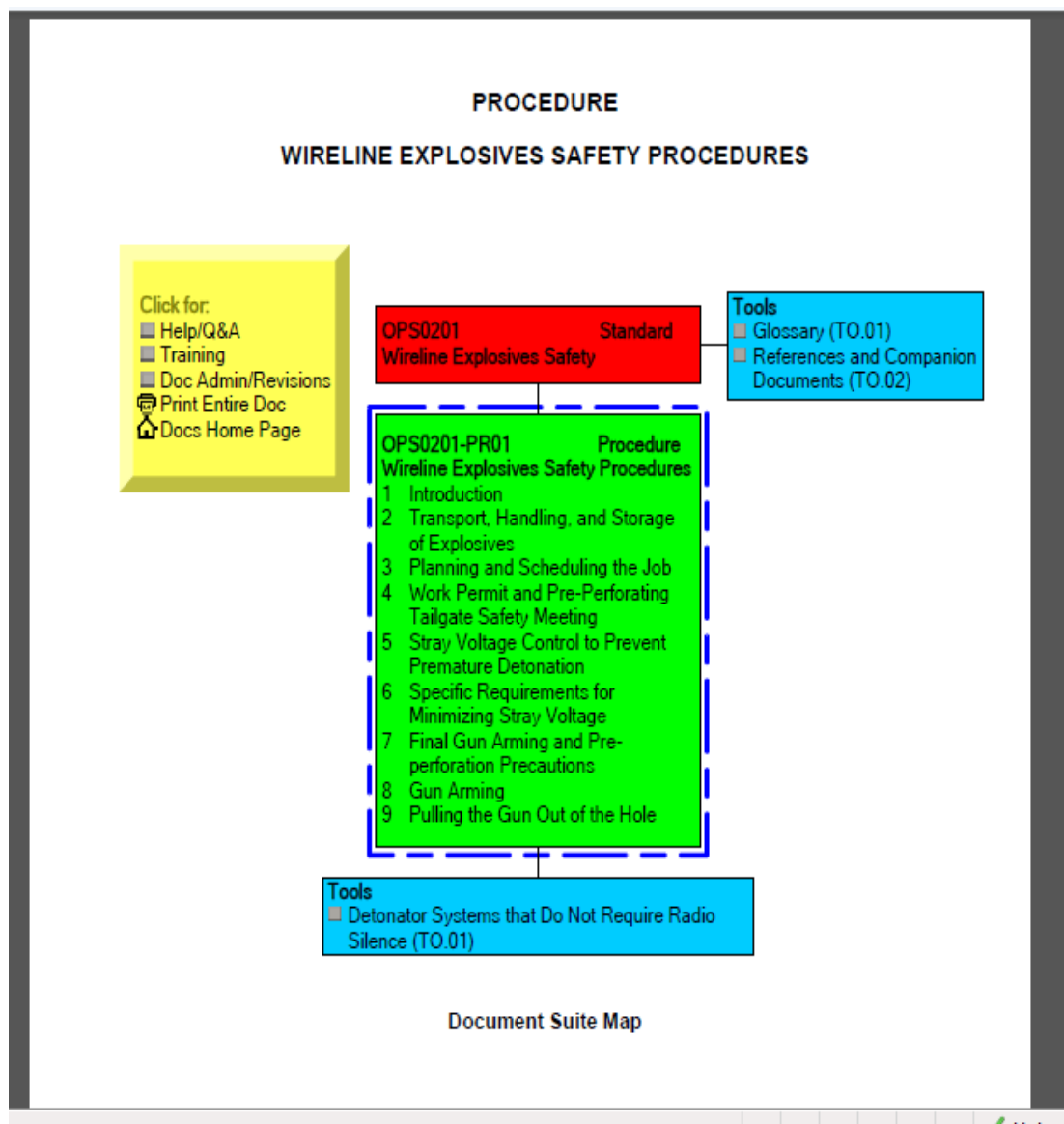
- Life Saving Rules
- Incident Management
- Contractor Management
- DROPS
- Emergency Preparedness
- Fitness to Work
- Lifting and Hoisting
- Short Service Employees
- Temporary Pipework
- Asset Integrity (Derrick / Structure)
- Well Control

Increased focus on well control

Mandatory Requirements for Onshore Well's Contractors:

1. Ensure the well control equipment on site is listed correctly in the electronic Well control assurance tool, "eWCAT".
2. Verify that the Shell foreman is made aware of any corrections or deficiencies
3. Verify that the contractor supervisor has appropriate (well control) training
4. Ensure that for BOP Equipment failures (including BOP Control System) including failures experienced during operating or while pressure and function testing of the equipment once initial integrity has been established on the well (I.e. once they are active barriers) is reported to the foreman.
5. Ensure any reduced functionality of the BOP system should be treated as a change in work scope and the Management of Change (MOC) process should be followed.

Perforating - Standards, guidelines, training



- Industry standards, e.g. API RP 67
- Shell internal standards
 - Explosives,
 - Perforating
 - Wireline
 - Well control
 - Coil Tubing
- Contractor forums

NON-TECHNICAL RISK: SHELL UNCONVENTIONALS OPERATING PRINCIPLES



Safety & Well Integrity

Shell designs, constructs and operates wells and facilities in a safe and responsible way.



Air

Shell conducts its operations in a manner that protects air quality and controls fugitive emissions.



Footprint

Shell works to reduce its operational footprint.



Water

Shell conducts its operations in a manner that protects groundwater and reduces potable water use as reasonably practicable.



Community

Shell engages with local communities regarding socio-economic impacts that may arise from its operations.

Perforating incidents do happen.....in industry



Perforating incidents do happen.....in industry

“A Wireline company experienced a surface detonation of a perforating gun on January 14th in South Texas. Two personnel were airlifted to San Antonio and a third was treated and released from a local hospital. The necessity of the sharing of data regarding explosives accidents and incidents has never been more pressing. There needs to be a greater emphasis on explosives safety and explosives safety training. The industry as a whole, manufacturers, vendors, service companies, and operators, must be onboard with this effort....

.....pressure from oil companies and the service company management when miss runs occur is tremendous. When the crews should actually be slowing down to look at what went wrong and what needs to be done to prevent further problems, they are being pushed to hurry up and get on with the job. This culture needs to change. “

Perforating incidents do happen.....in industry



Description of Incident

On September 22, 2011, xxx was performing a hydraulic fracturing operation on the yyy well and inadvertently perforated above the base of groundwater protection at a depth of **136** metres measured depth (mMD). Hydraulic fracturing operations were subsequently conducted using gelled propane as a carrier fluid, pumping 20.07 tonnes of sand and 130 cubic metres (m³) of gelled propane.

When it was realized that hydraulic fracturing had occurred through the shallow perforations, flow-back operations of the fractured interval were conducted. A two-well groundwater monitoring program was initiated and is ongoing to evaluate the impact of the incident upon groundwater.

Perforating incidents do happen.....in Shell



LEARNING FROM INCIDENTS ACTION ALERT

PTW-AC-2012-01

| Global Wells – Action for all Regions

| July 2012

High Potential Wells Process Safety Incident Temporary Equipment Pressure Leak

Target audience for this alert

- Wells Managers
- CWI and Drilling engineers & supervisors
- Production Operations supervisors
- CWI Service providers
- Production Technologists

What happened

After perforating a platform well, a wireline toolstring was being pulled out of hole when a gas leak was observed on a flange on the pump-in side outlet in the lubricator/riser equipment. The flanged connection was situated just below the wireline BOP but above the shear-seal BOP. The side outlet sub was connected to a valve assembly (see picture). To stop the leak, the nuts on the flange were tightened with the lubricator/riser under well pressure. The leaking



Help industry perforate more safely

**Thanks you for attending
Your work, expertise and collaboration
can help us achieve Goal zero**



