

Investigation report

Report	
Report title Loss of well barriers in connection with wireline operation on the Draugen facility.	Activity number 005093016

Classification		
<input checked="" type="checkbox"/> Public	<input type="checkbox"/> Restricted	<input type="checkbox"/> Strictly confidential
<input type="checkbox"/> Exempt from public disclosure	<input type="checkbox"/> Confidential	

Summary
<p>The incident occurred on the Draugen facility in connection with a wireline operation in well 6407/9-A-01 on 4 December 2010. Shell was the operator and Seawell AS (Seawell) was the contractor for the wireline operation. The incident was reported to the PSA on the same day. The objective of the wireline operation was to replace a gas lift valve.</p> <p>To replace the gas lift valve, the subsurface safety valve must first be extracted from the well. As the subsurface safety valve was pulled through the Xmas tree, it became stuck. The remaining barrier element in the Xmas tree, the upper swab-valve, was blocked.</p> <p>Normalisation of this incident was completed on 8 December 2010 by re-establishing the well barrier situation. To limit the risk associated with this well, the subsurface safety valve was run back into the well. Subsequently, two mechanical bridge plugs were inserted in the well above the subsurface safety valve. The other valves in the Xmas tree were closed, pressure-tested and accepted.</p> <p>Wellbarrier AS has been utilised for consultancy assistance in the investigation of this incident. The objective was to procure a technically independent assessment of the barrier situation and the barrier drawings in the different phases of the incident. "Evaluation of well barriers during Wireline activities" from Wellbarrier dated 11 January 2011, is attached to this investigation report.</p> <p>The incident did not result in any injury to personnel. The scope of material damage in the Xmas tree was not known at the time of the incident; however, the incident involved major accident potential in a situation with <u>only one</u> remaining barrier against hydrocarbon outflow from the well.</p>

Involved	
Main group T-2	Approved by/date Erik Hörnlund, 25 March 2011
Participants in the investigation group Monica Ovesen and Ola Heia	Investigation leader Stig Sandal

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1 Summary

1.1 Brief summary of the incident

The incident occurred on Draugen in connection with a wireline operation in well 6407/9-A-01. The well was completed and started producing in 1994. Since January 2010, the well has been shut-in. Planning for the wireline operation started in the 4th quarter of 2009.

During a planned test, it was discovered that the hydraulically operated main valve in the Xmas tree was not tight, which would entail repair or replacement. The wireline operation was therefore postponed until the main valve had been fixed. At the end of November 2010, the main valve had been repaired, and the implementation of the planned wireline operation could start again.

The primary objective of the wireline operation was to replace the existing gas lift valve. To gain access to the gas lift valve, the subsurface safety valve must be extracted.

When pulling the SSV, it became stuck in the valve head and blocked operation of the upper and lower main valves. The wireline toolstring was disconnected from the safety valve, completely pulled out of the well, and placed in the tool-catcher in the lubricator. The swab valve on the Xmas tree was closed.

The released toolstring blocked the W/L BOP valves, due to insufficient length of the lubricator. There was only one remaining barrier during further modification and re-building of the toolstring for subsequent run sequences.

One nonconformity was identified during this phase, and this led to preparing risk analyses for replacement and modification of the toolstring with only one barrier. The new toolstring was connected to the subsurface safety valve and put back in the subsurface safety valve's nipple profile. Subsequently, two mechanical bridge plugs were inserted in the well above the subsurface safety valve. Other valves in the Xmas tree were closed, pressure-tested and accepted.

The plan was for the wireline operation to use toolstrings that were longer than the available length between the lubricator's tool-catcher and shear ram on the wireline operation's BOP control. This use of a long toolstring involves increased risk due to obstructing the use of relevant barriers in an emergency situation. In this situation the opportunities to cut the wireline were impeded, and in addition, valves in the Xmas tree were blocked. The risk contribution for the actual incident was not identified in the operator's original wireline operation programme. It was also not identified in the revised plan after the incident involving loss of well barriers had occurred.

The incident did not result in injury to personnel, but limited material damage was registered, and major accident potential was present with one remaining barrier against hydrocarbon outflow from the well.

A/S Norske Shell (Shell) is the operator of the Draugen facility and Seawell AS (Seawell) is the contractor for execution of wireline operations. The subsurface safety valve was delivered from Halliburton, and was a type "Wireline Retrievable Sub Surface Safety Valve". The gas lift valve was delivered by Schlumberger Norge AS.

1.2 Cause of the incident:

The direct cause of the incident was the subsurface safety valve becoming stuck in the Xmas tree. It is not uncommon for damage to valve inserts to occur when extracting equipment from the well. When equipment becomes stuck, there can be increased strain on the equipment due to tugging and pulling to free the toolstring.

It is not possible to establish fail-safe methods for preventing things from becoming stuck in the Xmas tree during wireline operations, but robust solutions, analyses and a correct understanding of the risk that may be expected, can contribute to prevent the loss of well barriers if something gets stuck.

1.3 Identified nonconformities

- Inadequate management
- Inadequate risk assessment
- Inadequate well barriers
- Inadequate well barrier drawings
- Inadequate well control
- Inadequate daily reporting of drilling and well activities

1.4 Identified improvement items

- Personnel safety
- Expertise
- Governing documents on the facility
- Well barriers
- Cutting function in main valve
- Securing toolstring

2 Introduction

In connection with Shell's well maintenance on Draugen, the need to replace an inadequate gas lift valve was identified. The objective of the well intervention was to upgrade to a new type of valve that was qualified as a well barrier element. To replace the gas lift valve further down in the well, the subsurface safety valve must be extracted from the well.

An incident occurred as the subsurface safety valve was being pulled through the Xmas tree. The toolstring with the subsurface safety valve became stuck in the Xmas tree. The remaining barrier element in the Xmas tree was the upper swab valve; the other valves in the Xmas tree were blocked by the subsurface safety valve.

The Petroleum Safety Authority Norway (PSA) was notified of the incident and considered the incident to be serious and decided to carry out an investigation activity.

2.1 Procedure

The incident was reported by Shell on 4 December 2010 at 1600 hours, and a conference call between Shell and the PSA was held on 6 December 2010. Based on its own assessment and along with the information discussed during the call, the PSA investigation group was immediately established.

An unclear situation occurred on the facility and progress in the operation was put on hold until the company's plan for continuing the well intervention had been prepared. Risk assessments and an evaluation of different methods to free the toolstring with the subsurface safety valve were initiated. Compensating measures in this process included pressure-testing the swab-valve and continuous monitoring until normalisation could begin.

When the normalisation process was implemented, the original executing personnel were partially prevented from participating in conversations. This made the investigation group's task more difficult as regards finding a time and place to hold conversations with relevant personnel.

On 7 December 2010, the investigation group therefore chose to call a start-up meeting in Shell's offices in Tananger. In the meeting, the PSA informed Shell of its mandate for carrying out the investigation and what information and documents the company needed to make available. Shell informed the PSA of the status of the situation and its plans for initiating normalisation.

Conversations were held with personnel from Shell and Seawell during the period 9-10 December 2010. The conversations were held at Shell's offices in Tananger and at Seawell's offices in Dusavika. In addition, a phone call was held with the well manager responsible for executing well intervention on the Draugen facility. The conversations had an open dialogue, and Shell and Seawell ensured good facilitation during the implementation of the investigation.

2.2 Mandate for investigation

Our mandate for the investigation of the incident on the Draugen facility:

- 1) Clarify sequence of events and scope, assess triggering and underlying causes as well as the operator's – A/S Norske Shell's – follow-up measures
- 2) Describe actual and potential consequences; inflicted injury to people, harm to the environment and material assets, as well as considering the potential for injury to people and harm to the environment and material assets
- 3) Assess safety and preparedness factors, as well as operational, technical and management factors in relation to the incident.
- 4) Identify any breaches of the regulations – nonconformities in relation to requirements, methods and procedures – as well as recommend further follow-up and indentify a potential need for use of measures
- 5) Discuss and describe any uncertainties and confusion
- 6) Prepare a cover letter and investigation report in accordance with templates.

3 Sequence of events

3.1 Wireline operation description

The programme and planning of the activity originally started in 2009. The scheduled time for the well intervention was February 2010; however, it turned out that there was a need to improve the hydraulically operated main valve in the Xmas tree. The well intervention was therefore postponed until the main valve's function was accepted. In November 2010, the well was plugged and shut-in with two mechanical bridge plugs inserted between the subsurface safety valve and the Xmas tree. The objective of the well intervention was to remove these plugs, extract the SSV and then replace the GLV with a new type of valve which was qualified as a well barrier element. The well intervention was estimated to last eight days.

The plan was to use a standard rigging plan and wireline operation equipment for the activity. This plan indicates that the toolstring would be longer than the available length in the lubricator and would block the BOP valves. Risk assessments and compensating measures were not carried out to safeguard the need for two available barriers with the toolstring placed in the upper position in the lubricator.

At the time of the incident, the wireline operation crew was about to extract the retrofitted insert type subsurface safety valve (SSV) in the gas lift well 6407/9-A-01. As the toolstring with the SSV passed the upper part of the well it became stuck in the Xmas tree. Repeated attempts are made to free the SSV, which resulted in the pulling tool's shear pin being cut. It thus became impossible to extract the SSV from the well.

In the situation that occurred, the SSV was left in the well, while the toolstring needed to be pulled out for re-building. Thus, the SSV was left in the Xmas tree and blocked the possibility of operating the valves in the Xmas tree with the exception of the swab-valve. Consequently, the toolstring was pulled out of the well and the swab-valve was closed.

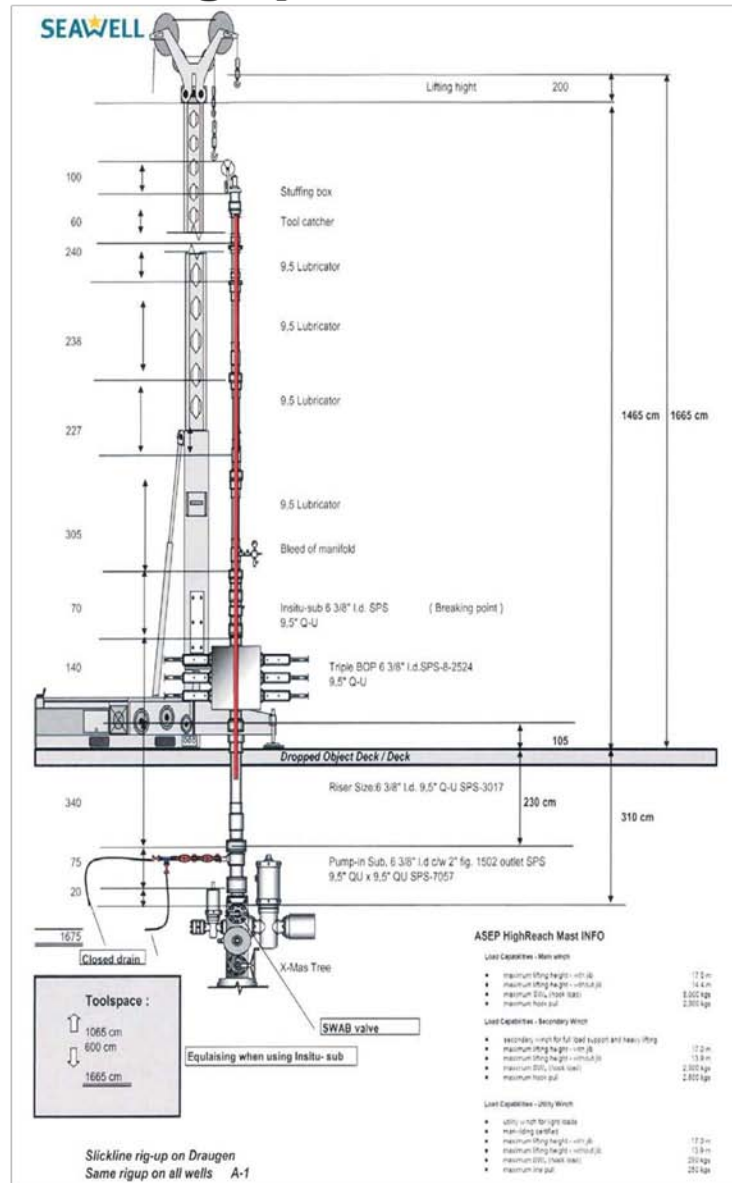
3.2 Follow-up of the incident

Shell did not consider the incident to be serious or requiring further follow-up or investigation. The incident was considered closed by Shell in an email received by the investigation group on 16 December 2010.

W/L rig-up on well 6407/9-A-01

Length of
W/L-
toolstring:

13,83 meter



Available length
from stuffing-box to
top of BOP:

11,40 meter

4 The potential of the incident

4.1 Actual consequences

The scope of material damage in the Xmas tree was not known when the toolstring became stuck. No injuries to personnel were registered, and there were no discharges to the external environment due to the incident.

During the planning and management of this wireline operation, all contributors to maintaining well barriers were not sufficiently assessed. This included factors such as choice of equipment, quality of the risk assessments and decisions made for the different operation phases in the well intervention programme.

During the execution of the well intervention, a sufficient risk assessment was not made as regards the subsurface safety valve (SSV) becoming stuck in the Xmas tree. The choice of toolstrings and consequence-reducing measures with the loss of barriers was not included in the risk assessment.

During further execution, the company operated with inadequate well barriers in the different phases of the well intervention. This entailed an increased risk level for the activity where well barrier elements in the operation were not sufficiently emphasised. A main cause of this was that the company's system for using well barrier drawings was not sufficiently developed for all phases of the wireline operation.

As the incident became a fact, a situation with deficient management of robustness in connection with the choice of equipment during normalisation of the incident occurred. This includes inadequate availability of barriers in the form of valves, weighted well fluid and inadequate staffing of the pump assembly.

Data from this well had not been reported to the PSA's database for daily reporting of drilling and well activities, the "Common Drilling Reporting System".

4.2 Potential consequences

In this incident with one remaining barrier in the wellhead area, the further activities in the area were carried out with major accident risk. The main contributors to a major accident situation in the well area were falling objects in connection with rigging up and replacing the toolstring. Another high risk was that wireline breaches could result in the toolstring falling uncontrollably inside the well.

The company chose to continue the well intervention while also continuing production from the other wells on the facility. In such a situation, with one remaining barrier and the toolstring stuck in the Xmas tree, the company is required to consider the prudence in continuing the operation and the need for shutting down production when normalising the well intervention.

In rebuilding and modifying the tool string, there was a significant challenge associated with the risk that a wireline breach would lead to increased damage to the only remaining barrier, which was the swab-valve. The actual rigging with a wireline operation must without scaffolding, and without a derrick to assist and available pump capacity for kill mud on the facility in a well control situation. In such a continuation of the operation, the margins for maintaining a sufficient prudence level are very limited.

5 Observations

The PSA's observations are generally divided into three categories:

- Nonconformities: In this category we find observations which the PSA believes are breaches of the regulations.
 - Improvement item: Related to observations where the PSA finds deficiencies, but does not have sufficient information to prove breach of the regulations.
 - Conformity/barriers that have functioned: Used in the event of proven conformity with regulations.
-
- In connection with the observations in Chapter 5 of the report, reference is made to provisions (requirements) in the HSE regulations that applied at the time of the incident. The relevant provisions are equivalent or mainly continued in the new HSE regulations that entered into force on 1 January 2011. For information, in Appendix D to the covering letter, there is a table showing which provisions in the new regulations continue previous provisions cited in Chapter 5. More information about the new regulations can be found on www.ptil.no.

5.1.1 Inadequate management

Nonconformity:

In connection with the company's planning and management of this well intervention, all risk contributors were not sufficiently assessed. The contributors to this were not sufficiently identified in the plans for implementation on the facility.

Basis:

During conversations and when reviewing daily work descriptions, it was identified that the following items constituted deficiencies in the planning and management of the operation:

- risk factors were not sufficiently highlighted in the company's well intervention programme
- the plan was to use a toolstring which was longer than the available lubricator length, which led to the toolstring blocking the BOP
- the toolstring obstructed access to relevant barriers during this emergency situation and the possibility of cutting the wireline in an emergency situation
- there was only one barrier available when modifying the toolstring between each run sequence after the subsurface safety valve (SSV) became stuck
- as the toolstring blocked the BOP and swab-valve in the operation phases by freeing the SSV from the Xmas tree, the only remaining barrier was the upper lubricator gasket
- in the event of an escalation of the incident with further loss of well control, a separate action plan for this well intervention had not been prepared
- the company's assessment of the situation entailed that other wells on the facility during this emergency situation with loss of barriers were not shut down
- the company's assessment of the situation entailed that there was no need for an internal investigation

Requirements:

Section 3 of the Management Regulations relating to management of health, safety and the environment

Section 9 of the Management Regulations relating to planning, cf. Section 27 of the Activities Regulations relating to planning

Section 19 of the Management Regulations relating to registration, review and investigation of hazard and accident situations

Section 77 of the Activities Regulations relating to well control

5.1.2 Inadequate risk assessment

Nonconformity:

A sufficient risk review as regards choice of rigging equipment, toolstring and consequence-reducing measures with the loss of well barriers was not carried out.

Basis:

It was identified through conversations and the review of the risk matrix and daily work descriptions from the execution of the well intervention that:

- the need for sufficient height when rigging the lubricator in the area was not emphasised
- the outcome with this type of SSV becoming stuck in the Xmas tree was not identified in the risk review before the activity
- consequence-reducing measures were not implemented on the facility when the SSV became stuck in the Xmas tree
- loss of barriers was not sufficiently emphasised in the risk reviews that were carried out in connection with the well interventions

Requirements:

Section 1 of the Management Regulations relating to risk reduction, Section 13 relating to general requirements for analyses and Section 15 relating to risk analyses and emergency preparedness analyses

5.1.3 Inadequate well barriers

Nonconformity:

There were inadequate well barriers during various phases of the well intervention.

Basis:

It was identified through conversations and a review of the daily work description that the well barriers in three out of nine different phases of the operation were not sufficiently qualified.

- when the SSV was stuck in the Xmas tree and connected to the toolstring, the barrier situation was deficient
- when down rigging the wireline operation equipment with the toolstring after disconnecting the stuck SSV, the barrier situation was deficient
- When carrying out wireline operations to free the SSV from the Xmas tree, the barrier situation was deficient

See appendix from Wellbarrier, report no. SPF 101204, Rev. 01: “Evaluation of well barriers during Wireline activities”, Chapters 4.4, 4.6 and 4.9 for further information.

Requirements:

Section 1, second subsection of the Management Regulations relating to risk reduction and Section 2 relating to barriers, as well as Section 76 of the Activities Regulations relating to well barriers

5.1.4 Inadequate well barrier drawings

Nonconformity:

There was inadequate use of well barrier drawings as regards application and scope of the different phases of the well intervention.

Basis:

During review of documents relating to the wireline operations it was identified that:

- well barrier drawings in the work description had not been prepared for the different phases of the wireline operations
- the well barrier drawing that was used, only described a production well under normal conditions

Requirements:

Section 72 of the Activities Regulations relating to well programme and Section 76 relating to well barriers, Section 1, second subsection of the Management Regulations relating to risk reduction and Section 2 relating to barriers

5.1.5 Inadequate well control

Nonconformity:

The equipment was inadequately robust for re-establishing the barriers in the event of loss of well control.

Basis:

Through conversations and a document review, it was identified that:

- the well was a discharge source with a shut-in pressure of 22 bar
- in the event of loss of well control the facility does not have a derrick for re-establishing well barriers
- in the event of an escalation of this incident, the facility lacks other immediate intervention opportunities
- the drilling fluid system on the facility was not used for well control at the time of the incident
- the cement pump unit on the facility was not staffed at the time of the incident
- the maintenance status of the cement pump unit was not known to the executing personnel

Requirements:

*Section 23 of the Management Regulations relating to continuous improvement
Section 1, second subsection of the Management Regulations relating to risk reduction and Section 2 relating to barriers
Section 77 of the Activities Regulations relating to well control
Section 42 of the Activities Regulations relating to maintenance*

5.1.6 Inadequate daily reporting of drilling and well activities

Nonconformity:

Daily drilling and well activities for this well had not been reported to the PSA's database, "Common Drilling Reporting System" (DDRS).

Basis:

During review of DDRS it was verified that:

- data has not been reported from this well in connection with well intervention

Requirement:

Section 17 of the Information Duty Regulations relating to reporting of drilling and well activities

5.2 Improvement items

5.2.1 Personnel safety

Improvement item:

There is a need to improve the personnel safety when rigging and executing wireline operations.

Basis:

It became evident during conversations and when reviewing documents that there is an established practice in the industry for rigging for wireline operations using a mast at the hatch deck, see Figure 1.

There are many risk factors for personnel working in the well area. The Draugen facility is not equipped with a derrick and the module-based tower for wireline operations was not used. It became evident during the investigation that the company had not considered the need for development of solutions that improve personnel safety on the hatch deck.

Requirements:

Section 8 of the Framework Regulations relating to prudent activities

Section 9 of the Facilities Regulations relating to installations, systems and equipment

Section 3 of the Management Regulations relating to management of health, safety and the environment

5.2.2 Expertise

Improvement item:

Shell's internal requirement for conducting regulations courses for personnel in Seawell AS were not complied with.

Basis:

It was identified during conversations and through document reviews (TS02 Item 4.2.1) that management personnel from Seawell AS on the facility did not satisfy Shell's internal requirement of completing familiarisation courses within the HSE regulations.

Requirements

Section 19 of the Activities Regulations relating to competence, cf. Section 11 of the Management Regulations relating to manning and competence.

5.2.3 Governing documents on the facility

Improvement item:

The company's system for making governing documents available on the facility could be improved.

Basis:

It became evident during conversations with executing personnel that an IT system for governing documents was not available on the facility.

Requirements:

Section 3 of the Management Regulations relating to management of health, safety and the environment

5.2.4 Well barriers

Improvement item:

The company's acceptance criteria for putting the subsurface safety valve back in the valve profile in the well in this emergency situation can be improved.

Basis:

During the normalisation phase, the SSV valve was put back in, pressure-tested and accepted. Such an operation entails that the SSV valve was not in a verified safe position in the well. If the shear pin in the driving tool was not cut correctly, it means that the verification of the correctly placed valve is incomplete. This involves risk for the valve coming loose and, in a worst case scenario, moving uncontrollably upwards in the well.

See appendix from Wellbarrier, report no. SPF 101204, Rev. 01: "Evaluation of well barriers during Wireline activities", Chapter 4.10 for more information.

Requirements:

Section 1, second subsection of the Management Regulations relating to risk reduction and Section 2 relating to barriers
Section 76 of the Activities Regulations relating to well barriers

5.2.5 Cutting function in main valve

Improvement item:

There was a need to improve the company's assessment regarding use of the cutting function of the main valve and use of temporary shear ram.

Basis:

The hydraulic main valve was qualified with a cutting and sealing function for wireline. According to the operation plan from the company, this main valve function would replace the requirement of having a temporary shear ram rigged up. In instances where the need to carry out a cutting operation arises, we request the company's assessment of preferring use of the hydraulic main valve compared with using the temporary extra shear ram.

See appendix from Wellbarrier, report no. SPF 101204, Rev. 01: "Evaluation of well barriers during Wireline activities", Chapter 6 for more information.

Requirements:

Section 1, second subsection of the Management Regulations relating to risk reduction and Section 3 relating to barriers
Section 76 of the Activities Regulations relating to well barriers

5.2.6 Securing toolstring

Improvement item:

There was a need to improve the company's use of the safety device when hanging the toolstring.

Basis:

It became evident during conversations and through the review of the daily work description that the safety device (cable clamp) was not used during the normalisation phase. Risk factors in a situation with wireline breach could lead to the toolstring falling uncontrollably with a risk of damaging the swab-valve and BOP.

Requirements:

Section 1 of the Management Regulations relating to risk reduction
Section 9 of the Facilities Regulations relating to installations, systems and equipment

6 Discussion regarding uncertainties

There may be uncertainties related to the investigation group not identifying sufficient basis for verifying the circumstances surrounding this incident out on the facility. It was also the opinion of the company that all details regarding the incident could be communicated through conversations on land and through review of documents. Our opinion is that the factors of the incident were so serious that the company's duty to re-establish well barriers needed priority.

Direct conflicts have not arisen from individuals' viewpoints in conversations and through verification of documents. In connection with access to governing documents on the facility, there were different opinions from the supplier of well services compared with the wireline operator's access to governing documents.

6.1 The investigation is based on the following documents

- Wellbarrier; Evaluation of well barriers during Wireline activities, rev. 1, 11.01.2011
- A/S Norske Shell E&P Draugen. Change Proposal 001 for Draugen A1. Guidelines Doc. A1 WRSSSV/GLV Replacement Draugen Platform December 2010, 06.12.2010
- Draugen A01 – WRSSSV Recovery operations / Toolstring break out with single well barrier
- Shell Deviation Control Form – 139687, 05.12.2010
- Shell; Well Barriers Schematic Draugen, last updated 06.01.2010
- Shell EP Wells daily operations report, report 7, 06.12.2010
- Shell EP Wells daily operations report, report 6, 05.12.2010
- Shell EP Wells daily operations report, report 5, 04.12.2010
- Shell EP Wells daily operations report, report 4, 03.12.2010
- Shell EP Wells daily operations report, report 3, 02.12.2010
- Shell EP Wells daily operations report, report 2, 01.12.2010
- Shell EP Wells daily operations report, report 1, 30.11.2010
- Confirmation of notification/reporting to the Petroleum Safety Authority Norway concerning hazard and accident situations, 04.12.2010
- Risk Assessment Matrix for use in Incident Investigation & Reporting, rev 7, 10.10.2010
- Total risk analysis of Draugen
- Draugen Emergency Preparedness Analysis, A/S Norske Shell E&P, 01.01.2006
- Shell; Fountain Report (WRSSSV stuck across the Surface Xmas Tree). Status: Closed
- Shell Draugen; Work permit 9500073400, Wireline A1. Monitoring of lubricator. 04.12.2010
- Shell Draugen; Work permit 9500073303, Wireline A1. Run in hole. 04.12.2010
- Shell Draugen; Work permit 9500073302, Wireline A1. Run in hole. 03.12.2010
- Shell, Draugen platform Concurrent activities matrix

- Shell, Concurrent operations policy, rev.code 001, issued 04.06.07, review date 04.06.09
- Seawell, Slickline rig-op on Draugen, A-1
- Seawell, MS-0004113, WLE – Checklist between two runs, Revision number 7, 27.10.2010
- Seawell; Checklist for wireline operations, Platform Draugen, Well A-01, 04.12.2010
- Seawell; procedure for well control exercises, Revision number 6, 28.10.2010
- Well Services Draugen, DRAW40-Weather Deck W41, W42 & W43, SJA NR. 15385,
- Conduct Wireline Operations on Draugen Well A-01. SJA Responsible: RIS OLWE WSS NORSKE-EPE-T-WD, 30.11.2010
- Well Services Draugen, DRAW40-Weather Deck W41, W42 & W43, SJA NR. 15427,
- Free WRSSSV in Surface Xmas Tree and Set in TRSSSV Nipple. SJA Responsible: Draugen daws NORSKE-EPE-T-WD, 7.12.2010
- Well Services Draugen, DRAW40-Weather Deck W41, W42 & W43, SJA NR. 15426,
- Wireline Operations. Recover Toolstring # 11 and leak test Wireline BOP. SJA Responsible: Draugen daws NORSKE-EPE-T-WD, 7.12.2010
- Well Services Draugen, DRAP43-DOP deck (Drop object deck), SJA NR. 15384, Rig Up Wireline on Well A-01. SJA Responsible: RIS OLWE WSS NORSKE-EPE-T-WD, 30.11.2010
- Well Services Draugen, DRAW40-Weather Deck W41, W42 & W43, SJA NR. 15385, Conduct Wireline Operations on Draugen Well A-01. SJA Responsible: RIS OLWE WSS NORSKE-EPE-T-WD, 30.11.2010
- Well Services Draugen, DRAW40-Weather Deck W41, W42 & W43, SJA NR. 15426, Wireline Operations. Recover Toolstring # 11 and leak test Wireline BOP. SJA Responsible: Draugen daws NORSKE-EPE-T-WD, 7.12.2010
- EP WELLS DAILY OPERATIONS REPORT, Report 9, 08/12/2010, Well 6407/9-A-1, Wellbore 6407/9-A-1, Well Type Development, Company A/S NORSKE SHELL, WBS No/API No
- Halliburton, Make Up / Running / Pulling procedures for Insert valve, 12.01.10 Released for customer review
- TECHNICAL STANDARD, UIE WELLS, WELL BARRIER REQUIREMENTS, (TS02), DEP 38.80.00.11 EPE, Revision 01, November 2010

- TECHNICAL STANDARD, WELL INTERVENTION WELL CONTROL, UIE (EPE) WELLS, (TS10), DEP 38.80.00.18 EPE, Revision 02, March 2010
- Wellservices POB/Crew Changes. Total POB for Wellservices Crew: 15- 07/12/10
- Deviation Control Form - 139687 STANDARDS APPROVED
- Draugen A1 Working against the single barrier of inflow tested swab valve
- Valid To: 12/31/2010
- Well Intervention Team (WIT) Bridging Document, issued 1 August 2010
- Change Proposal 001 for Draugen A1. Guidelines Doc. A1 WRSSSV/GLV Replacement Draugen Platform December 2010, issued 6 December 2010
- Draugen Platform, A01 Slickline WRSSSV/GLV, Replacement Guidelines, Revision 0

7 Appendices

B: Wireline activity barrier evaluation rev.1

C: Overview of conversations held.

D: Overview of relevant provisions in previous and new HSE regulations.

E: Detailed incident description