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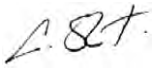
Colin Stuart	Managing & Technical Director of Stuart Wright Pty Ltd		17 February 2012
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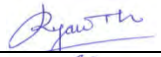
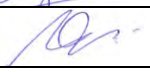
Myo Kyaw Thu	Well Engineer		17 February 2012
Linus Lim	Well Engineer		17 February 2012
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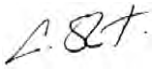
Colin Stuart	Managing & Technical Director of Stuart Wright Pty Ltd		17 February 2012

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1. Introduction

This is Volume 3 of 3 of the Report by the NOPSA engaged Expert Witness entitled

"**INVESTIGATION INTO THE UNCONTROLLED RELEASE OF HYDROCARBONS FROM THE MONTARA WELLHEAD PLATFORM ON THE 21 AUGUST 2009 – EXPERT WITNESS REPORT".**

Volume 3 contains supporting information pertaining to the Expert Witness's opinions and findings in relation to the nine questions raised by NOPSA on the investigation into the uncontrolled release of hydrocarbons from the Montara Jacket Platform on the 21 August 2009.

Part of the supporting information includes the Well Integrity condition of the H1-ST1 well at various critical stages of construction, suspension, and re-entry. The Expert witness has used the proprietary Stuart Wright Pte Ltd's **WAiT© (Well Assessment of Integrity Tool)** to explain the condition of the H1-ST1 well at these different stages. The Well Integrity condition is shown in a visual chart format using the WAiT© process. There are two WAiT© charts in A0 size.

The SWPL WAiT© process is a comprehensive review platform used to drive a "forensic" assessment of the candidate wells' integrity status, and can be applied to all stages of wells' investigation and asset-wide risk assessment and management. The SW WAiT© process captures the subsurface environment data, well architecture (as-built condition), and as required, the production historical data of a well in an integrated view, and represents this data in the form of a WAiT© chart.

For the purpose of this investigation, the WAiT© process is used to assess the Well Integrity condition of the H1 and H1-ST1 Wells, represented in the form of two (2) charts as follows:

1. WAiT© #1 – An integrated assessment of the Well Integrity status for the Construction and Abandonment of H1 Well, and subsequent Well Integrity status for the Construction and Suspension of H1-ST1 Well.

2. WAiT© #2 – An integrated assessment of the Well Integrity status for the Re-entry of H1-ST1 Well to the Blowout Event.

Volume 3 also includes the "Timeline of relevant facts and events" focusing on the approvals PTTEPAA received from the NTDRDPIFR to undertake Montara Development activities from commencement of operations to the H1ST1 blowout event. In addition, where an activity is performed by PTTEPAA as Operator **without** prior approval from the NTDRDPIFR, or where it deviates from the approval given by the NTDRDPIFR, this is recorded in the Timeline. The Expert Witness has also recorded on the timeline comments specifically relating to points in time where Risk Assessments should have been performed using "Good Oilfield Practice".

Finally, Volume 3 contains the Expert Witness's response to specific queries from NOPSA raised during the course of the Expert Witness investigation period.

2. A Timeline of relevant events from 13 February 2007 to 21 August 2009

As requested by NOPSA, the Expert has incorporated a "Timeline of relevant events from 26 January 2009 to 21 August 2009" in this investigation report. In reviewing the timeline, the expert has expanded the timescale to a start date of 13 February 2007. This is to capture the planning and approval stage which is highly relevant to the expert witness on the outcome. The timeline review has considered the NOPSA document "Assumed Facts"; the PTTEPAA unapproved Deviation from NTDA Approvals/ from Internal MOC, and Risk Assessment Opportunities Identified by the Expert Witness.

The timeline review by stages is illustrated by a panel with 3 columns.

1. Column 1: **Assumed Facts** - Montara Wellhead Platform at four (4) stages of the H1-ST1 well.
2. Column 2: **PTTEPAA Unapproved Deviation from NTDA Approvals**/Internal MOC.
3. Column 3: **Risk Assessment Opportunities** Identified by the Expert Witness.

The timeline is divided into 4 stages as follows:

1. Planning & Approval Stage
2. H1-ST1 Construction Stage
3. Suspension Stage
4. Re-entry Stage

During the preparation of Column 1 of the Timeline, the Expert has compared the information described in the NOPSA document "Assumed Facts" against the DDR, NT Approvals and PTTEPAA WCCCF. Any opinions and information obtained post Montara Blowout, described in the NOPSA document "Assumed Facts", were not included in the Expert Witness's time line.

While preparing Column 1 of the Timeline, the Expert identified unapproved deviations of the NT DA approvals by PTTEPAA as well as deviations from PTTEPAA internal change management (MOC), which can be found in Column 2 of the Timeline.

In order to identify any **internal deviation** on the part of PTTEPAA, the Expert has referenced **Section 4.1.8 Change Management** in the *Construct Service or Abandon Well Process* (DB-30291-NOPSA-401), one of three documents found in the PTTEPAA *Well Construction Management System.

The activity "Change Management" is defined by PTTEPAA as a reoccurring activity run in parallel with core processes 4.1.1, 4.1.2, 4.1.3 and 4.1.4 (See Figure 1) in response to changes in the Statement of Requirements, Basis of Design or Well Programmes that were brought about by scope changes or unforeseen operational incidents. The tasks defined in the activities are as follows:

1. **Identify Requirement for Change and Justify**
    a. Complete Change Request complete with justification
    b. Maintain Change Register
    c. Following changes are subjected to change control:
        i. Changes that significantly increase risks or changes to well objectives, trajectory, pressures, etc.
        ii. Changes in material specifications or requirements including surplus materials or cancellation charges
        iii. Changes the cost by USD$0.5M
    d. Proposed changes should be carefully thought through and the change proposer should be prepared to substantiate the change including the gains to be made, the resources required and the impact of not making the change.
2. **Engineer Change**
    a. Engineer change in accordance with the Well Construction Standards
        i. Wherever possible, changes are engineered to the same level of details as the original design
    b. Carry out hazard analysis and risk mitigation in accordance with Risk Management Activity
    c. Prepare programme revision if engineer change
3. **Record and Disseminate Change**
    a. Update the Change Register and e-mail all persons details of the change

b. Record learning experience in Knowledge Database if applicable (Knowledge Management Activity)

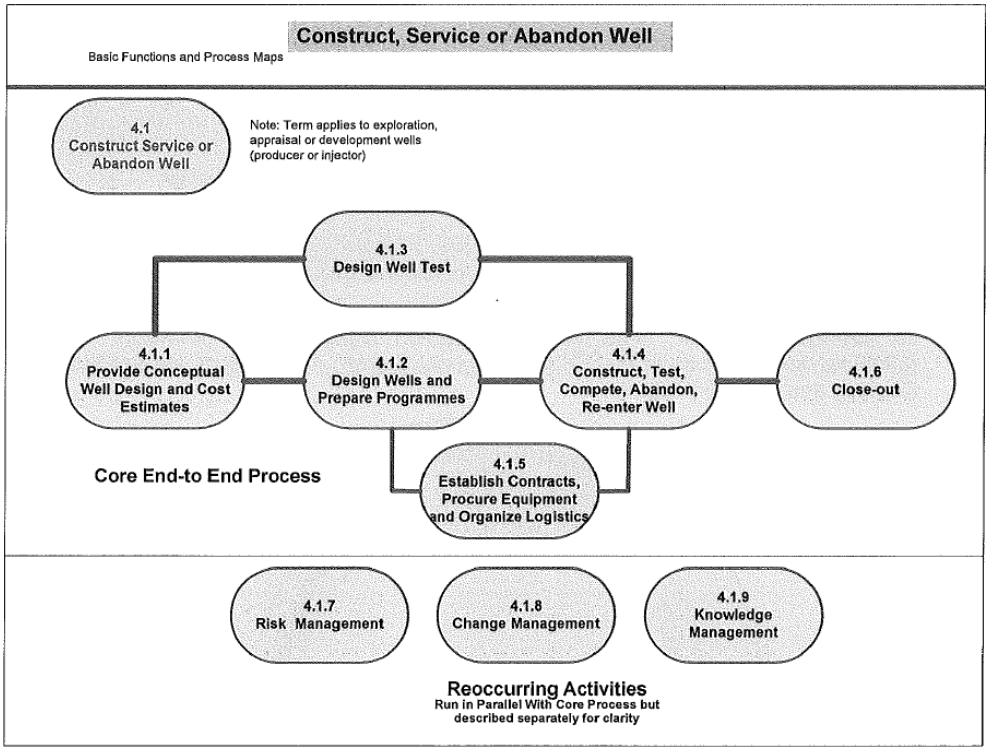


Figure 1 : PTTEP Management System Framework, Develop and Service Wells Process

Column 3 of the Timeline contains specific risk assessment opportunities which the expert has concluded would have been beneficial to PTTEPAA in identifying key risks, and enabled effective controls and mitigation to be implemented.

*Note: The PTTEPAA Well Construction Management System (as defined in Page 18 of the Safety Case Revision ("EV0000055"), a bridging document jointly prepared by ATLAS and the PTTEPAA Well Construction Department), was agreed to be the governing document: "*During the WHP well construction, activities will be managed in accordance with PTTEP Australasia Well Construction Management System.*"

2.1 Legend

The figure below explains the symbols used in Timeline of relevant events.

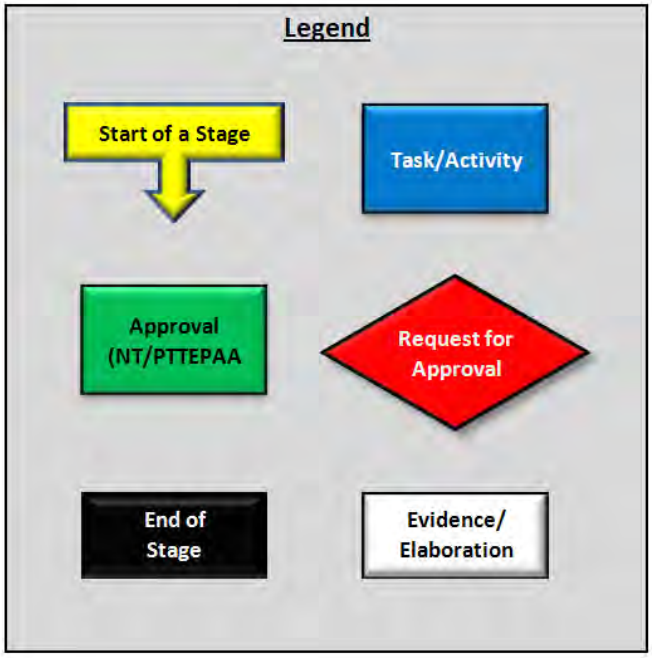


Figure 2: Legend for Timeline of relevant events

2.2 Timeline - Planning & Approval Stage

Assumed Facts - Montara Wellhead Platform @ H1-ST1 Planning and Approval Stage			PTTEPAA Unapproved Deviation from NTDA Approvals/Change Management	Risk Assessment Opportunities In the Expert's Opinion
Feb'07	13th	**CR submitted** Operator Registration for Montara, the FPSO and WHP, associated wells equipment and secondary lines to NOPSA		
	22nd	**NOPSA accepted CR** as Facility Operator		
Jul'07	1st	**SEADRILL** submitted *Safety Case Rev 1 for WA to NOPSA	*EV0000006	
Aug'07	14th	**NOPSA accepted** *Safety Case Rev1 as submitted by **ATLAS	*"Safety Case Rev1" outlines SEADRILL's safety management capability as well as demonstrating that the Major Accident Event risks have been identified and managed ALARP* *"ATLAS" (Atlas Drilling) is a wholly owned subsidary of SEADRILL .*	
Sep'07	15th	**Andrew Jaccobs (AJ) of PTTEPAA informed NOPSA** on the duration of the contract they had in place with ATLAS		
	26th	**CR** approved Well Construction Standards Version 1	*"Well Construction Standards version 1" is CR's internal document that is defined to be applicable to all aspects of well design, construction, well servicing and well management.*	
Nov'07	9th	**AJ issued a letter to NOPSA** confirming that the Operator Nomination for the Montara FPSO and WHP facility was for each of the construction, installation, operation, modification and decomissioning stages of the life of the facilities.		
	5th	**CR submitted to NOPSA a** Safety Case for the construction & installation of the proposed Montara Development	*EV0000010	
Feb'08		**NOPSA** accepted Safety Case Submitted by CR		
		CR issued NOPSA the Montara Development *SIMOPS plan Revision 1	*EV0000009	

Jun'08	30th	Installed the jacket for the Montara WHP on location		
July'08		**CR issued** *Montara Development BOWD for H1 well	The Expert has not seen evidence to suggest that the BOWD had been submitted to NOPSA/NT for approval and hence concludes that this is an **internal submission** by CR. *EV0000073	
Sep'08	30th	**CR issued** *Drilling Programme (Batch Drilled) Rev0 of Montara GI, H1 & H4	*The drilling programme forms part of WOMP Rev 0 that assumes Platform topsides in place and wells will be batch drilled and completed. The Expert has not seen evidence to suggest that this document had been submitted to NOPSA/NT for approval and hence concludes that this is an **internal submission** by CR. *EV0000613	
Nov'08	3rd	**CR issued** Montara H1 *WOMP Rev0	*The WOMP describes the CR management system which ensures that the risks associated with the activities relating to drilling, completion and suspension of Montara H1 development well are managed in accordance with good oil field design and engineering practices. The Expert has not seen evidence to suggest that this document had been submitted to NOPSA/NT for approval and hence concludes that this is an **internal submission** by CR.*EV0000012	
	21st	**CR** sought approval from NT DoR to *batch drill 3 development wells - GI, H1 and H4.	The Expert concludes that this approval is based on *EV0000613 Montara GI, H1 & H4 (Batch Drilled) Drilling Programme Rev 0 issued on 30/Sep/2008.	
	21st	**NT DoR** accepted development wells programme by CR	*Expert Witness Document Ref: DB-30291-NOPSA-404*	
Jan'09	6th	**CR updated** and issued *Driiling Programme Rev2 of Montara GI, H1 & H4 :TM-CR-MON-B-150-00001 Rev 2.	*EV0000018 *assumed platform Topsides not in place and WA Conductor Deck Extension being used without conductor tensioner.* *EV0000018 plans to Batch Drilled to 9 5/8"shoe and suspended. Well surface, target locations, formation tops, and directional profile were not changed from *EV0000613	Typically, a MLS is designed to facilitate the temporary suspension of a well below the seabed where a drilling rig has to move off location, leaving no/minimal obstruction above the seabed. The MLS is essentially a casing hanger system within which all casing strings are contained and terminated at the MLS. **A documented Risk Assessment** should have been conducted in view of the assumption that a MLS would have to be installed to allow the wells to be suspended below the jacket since the Platform Topsides would not be in place and the wells to be batch drilled to the 9 5/8" (244mm) casing shoe and suspended.
	7th	**CR** issued NT DoR a *letter with TM-CR-MON-B-150-00001 Rev-2 attached.	*The Letter,EV0000013, stated following: 1. The revisions made to TM-CR-MON-B-150-00001 Rev1 to allow the Montara wells to be batch drilled to the 9 5/8" casing point and suspended without the WHP topsides in place 2. These wells will be tied back to the platform, drilled to the original planned TD and completed. 3. A separate Drilling Programme will be issued for this phase (point 2), taking into account the "as built" status of the platform and suspended wells.	
	12th	**Mr Marozzi, from NT DRD** *acknowledged receipt of TM-CR-MON-B-150-00001 Rev 2.	*EV0000014	
	15th	**WA** *positioned over Montara WHP for the purpose of drilling 4 oil producer and 1 gas injector for CR. → **H1-ST1 Construction Stage**	*EV0000501 PTTEP DDR GI #1	

2.3 Timeline - H1-ST1 Construction Stage

Assumed Facts - Montara Wellhead Platform @ H1-ST1 Construction Stage			PTTEPAA Unapproved Deviation from NTDA Approvals/Change Management	Risk Assessment Opportunities In the Expert's Opinion
Jan'09	15th	**WA** positioned over Montara WHP for the purpose of drilling 4 oil producer and 1 gas injector for CR.	**PTTEPAA Well Construction Management Framework** states that for any change management, the following tasks should be carried out: **1. Identify Requirement for Change and Justify** a. Complete Change Request complete with justification b. Maintain Change Register c. Following changes are subjected to change control: i. Changes that significantly increase risks or changes to well objectives, trajectory, pressures, etc. ii. Changes in material specifications or requirements including surplus materials or cancellation charges iii. Changes the cost by USD$0.5M d. Proposed changes should be carefully thought through and the change proposer should be prepared to substantiate the change including the gains to be made, the resources required and the impact of not making the change. **2. Engineer Change** a. Engineer change in accordance with the Well Construction Standards, wherever possible, changes are engineered to the same level of details as the original design b. **Carry out hazard analysis and risk mitigation in accordance with Risk Management Activity** c. Prepare programme revision if engineer change **3. Record and Disseminate Change** a. Update the Change Register and e-mail all persons details of the change b. Record learning experience in Knowledge Database if applicable (Knowledge Management Activity). **The risk of not achieving a sealed annulus exist and could significantly impact the suspension plan if the objective was not achieved. There is no evidence that point 2b was carried out, and therefore is observed to be a deviation from PTTEPAA Change Management.**	**PTTEPAA Well Construction Management Framework** states that for any change management, the following tasks should be carried out: **1. Identify Requirement for Change and Justify** a. Complete Change Request complete with justification b. Maintain Change Register c. Following changes are subjected to change control: i. Changes that significantly increase risks or changes to well objectives, trajectory, pressures, etc. ii. Changes in material specifications or requirements including surplus materials or cancellation charges iii. Changes the cost by USD$0.5M d. Proposed changes should be carefully thought through and the change proposer should be prepared to substantiate the change including the gains to be made, the resources required and the impact of not making the change. **2. Engineer Change** a. Engineer change in accordance with the Well Construction Standards, wherever possible, changes are engineered to the same level of details as the original design b. Carry out hazard analysis and risk mitigation in accordance with Risk Management Activity c. Prepare programme revision if engineer change **3. Record and Disseminate Change** a. Update the Change Register and e-mail all persons details of the change b. Record learning experience in Knowledge Database if applicable (Knowledge Management Activity). **Any changes made to the Cementing and Suspension programme should have been the subject of a documented Risk Assessment.**
	23rd	**CR SUP issued** a *WCCCF to increase Length of Tail Cement height for H-1 Well 9 5/8" csg from 2923m.MD to 2823m.MDRT, above top of Cycle IV formation (reservoir).	The Expert concludes that this is an **internal sumbission** by CR. *(EV0000800). *Attached with CR Cementing Program for H1.*	
	30th	**PTTEPAA WCM** issued *WCCCF for well H1 & H4. Proposed to suspend both wells at MLS with no PCCC on 13 3/8" x 9 5/8" annulus, Planned top of Lead Cement at 50m into 13 3/8" shoe.	The Expert concludes that this is an **internal sumbission** by CR. *(EV0000801) *Attached with CR Cementing Program for H1 & H4.*	
Feb'09	3rd	**CR** issued *Montara H2 & H3 (Batch Drilled) Drilling Programme Rev 0	*(EV0000615) *This program covered the drilling and suspension of H2 & H3 wells down to 9 5/8" casing point.*	
	11th	**CR** changed its name to PTTEPAA.		
	27th	**PTTEPPA applied to** NT DA for approval to sidetrack (ST) the H1 well in order to access a cleaner section of the reservoir.	*EV0000020	This application for NT's approval is deemed by the Expert to be a geological sidetrack. A geolgical sidetrack is a change to the **Well Objective** and falls into the definition of the changes subjected to a change control **as defined by 1.c above.** Other than this application submitted to the NT, The Expert has not been provided with evidence to suggest that the decision to side track was captured by PTTEPAA's Change Management.	A documented Risk Assessment should have been conducted to establish requirements for the P&A of the H1 wellbore in view of the fact that it had been drilled into the Montara Cycle IV reservoir.
	2nd	**NT DA approved** to ST the well H1. Well H1 renamed to H1-ST1 well.	*Expert Witness Document Ref: DB-30291-NOPSA-404*	
		WA drilled H1-ST1 well from 3130m -3796mMDRT (2654mTVDRT), entering Montara Cycle IV reservoir section.	*EV0000547 to EV0000550, PTTEPAA DDR H1-ST1	
	3rd	**PTTEPPA DSUP issued** a WCCCF to WA DSPR to run 9 5/8" centralizers of the H1-ST1 well across a *small gas sand.	*Gas sand* in the Gibson and Woolaston Formation The Expert concludes that this is an **internal sumbission** by CR. *EV0000021	

Mar'09	6th	**PTTEPPA WCM approved** change on same day.		
		PTTEPAA SSM issued a letter to NT DA requesting for *approval to commence suspension operations on H1-ST1.	*to suspend H1-ST1 well as per Drilling Programm Rev 0 submitted and approved by NT DA on 21 Nov 2008. That programme specified that a shallow cement plug in the 9 5/8" csg shall be set at 160m and a 13 3/8' MSL PCCC. The letter stated that the well would be suspended in two stages. Stage 1: Cement and P-Test 9 5/8" csg and install a pressure containing suspension cap. Stage 2: recover 13 3/8" csg above MLS and install 2nd Pressure containing suspension cap. The suspension illustrated was not in accodance with the approved drilling programme Rev 0. Stage 2 diagram not attached. *EV0000026	
		PTTEPAA Legal Coordinator sent an email with appllication for approval to suspend H1-ST1 well. (*EV0000026)		
		***Mr Marozzi of NT DRD provided** preliminary approval to suspend H1-ST1 Well	*Mr Marozzi was not legally authorized to approve this type of application as he was not the NT DA. Application was not formally approved by NT DA until 9 Mar 2009	Upon receiving a preliminary approval from a non NT DA (Mr Dominic Marozzi), PTTEPAA went ahead to execute the suspension of H1-ST1 well. Formal approval of Stage 1 suspension was provided by Mr Jerry Whitfield on 9 March 2009, after Stage 1 suspension was completed. **This is observed to be a deviation from the NTDA approval process.**
		*EV0000028	**PTFEPAA DSUP issued** instructions under CR letterhead for the cementing calculations and reporting form Rev2 for H1-ST1 well.	
		*The objective was to run and cement 9 5/8" csg of H1-ST1 well.	***Issued Montara H1-ST1 Forward Plan, number 17, Version 1.0.**	
		*EV0000033	**Issued Montara H1-ST1 Forward Plan, number 17, Version 2.0** which had the same objectives as Version 1.0.	
	7th		**PTTEPAA instructed** WA OIM to have his drilling crew install the 9 5/8" csg in the 12 ¼" hole of H1-ST1 Well.	
		*EV0000552, PTTEP DDR H1-ST1 #7	**PTTEPAA instructed HAL** to cement 9 5/8" csg as per approved cementing programme.	**On 30 January 2009**, PTTEPAA issued an Internal Well Construction Change Control Form (D65005A 003) for a revision of cementing program to the H1 Well. On the same day, Halliburtion issued Version 3 of the "Montara H1 Cementing Programme" to incoporate this new revision of the PTTEPAA's cementing requirement to the Halliburton programme. **On 7 March 2009**, the H1-ST1 9 5/8" Cementing Operation was conducted. As recorded in the Halliburton H1-ST1 9 5/8" EOW Cementing Report (DB-30291-NOPSA-419) and PTTEPAA 9 5/8" (244mm) Casing, Running and Cementing Report (EV0000028), the composition/properties of the physical Lead and Tail Slurry pumped is **distinctly different** from the Program requirements as stated above, and could have retarded the cement setting process thus increasing the risk of hydrocarbon flow. Further discussions can be found in Volume 2 of the Investigation Report. **The deviation found in the actual versus planned cement properties pumped should have been identified and captured by PTTEPAA's Change Management.**
		*EV0000552, PTTEP DDR H1-ST1 #7	**WA Driller pumped** programmed volume of inhibited SW into the well to displace the cement to the bottom of the well, using WA drilling pumps.	
		*EV0000552, PTTEP DDR H1-ST1 #7	**Plug bumped** upon pumping agreed volume of inhibited SW to displace the cement.	
		*EV0000552, PTTEP DDR H1-ST1 #7	**WA Driller handed well back to HAL** and HAL carried out PTest of 9 5/8" to 4000psi/10mins with 9.5 bbl of inhibited SW.	
		*EV0000552, PTTEP DDR H1-ST1 #7	On completion of PTest, HAL was instructed by PTTEPAA to bleed off the pressure, pressure fell to 200psi and 9.5 bbl of SW returned.	
		*EV0000552, PTTEP DDR H1-ST1 #7	***A sudden and unexpected increase in pressure and additional 7bbl of inhibited SW returned from the CSG before HAL could close the valve.**	
		*EV0000552, PTTEP DDR H1-ST1 #7	***PTTEPAA *instructed HAL** to pump *16.0 bbl of inhibited SW into 9 5/8" CSG.	
		*EV0000552, PTTEP DDR H1-ST1 #7	**Valve on Cement unit was closed** to maintain back pressure of 1200psi while WOC.	
		*EV0000552, PTTEP DDR H1-ST1 #7	**9 5/8" PCCC was installed** on H1-ST1 well following the WOC.	
		- Nipple-down BOP on 8th Mar 09 from H1-ST1 and skidded for H4. (DDR H1-ST1 Report #8, dated 8th Mar 2009, *EV0000552). BOP installed over H1-ST1 well on the 20th Mar 2009. (DDR H4 Report #21, dated 20th Mar 2009)	**PTTEPAA instructed WA OIM** to leave BOP on H1-ST1.	
		included in EV0000034	WA DSPR sent an *email to WA DSPR, PTTEPAA WCM and PTTEPAA DSUP relating to the Montara WHP morning reports.	**A documented Risk Assessment** should have been conducted to establish the **WELL INTEGRITY CONDITION of the H1-ST1 wellbore at the end of Stage 1 suspension** in view of the following reasons: 1. 9 5/8" floats failed and additional 7 bbl of flow back observed 2. 9 5/8" casing cement had to be re-displaced 3. Re-displaced cement barrier had not been verified 4. Surface pressure after the WOC period leaked from 1200psi to 647psi 5. No pressure test on the 9 5/8" PCCC had been conducted
	9th	**NT DA formally approved** applicaiton to suspend H1-ST1 well (EV0000040)		
		Stage 2 Suspension Stage		

2.4 Timeline - Suspension Stage

Assumed Facts - Montara Wellhead Platform @ H1-ST1 Stage 2 Suspension Stage			PTTEPAA Unapproved Deviation from NTDA Approvals/Change Management	Risk Assessment Opportunities In the Expert's Opinion
	On 11 Mar 2009 Formal approval from the NT DoR was granted for the suspension of Montara H1-ST1 well as described in the letter dated 6 Mar 2009 & TM-CR-MON-B-150-00001-Rev2			**PTTEPAA Well Construction Management Framework** states that for any change management, the following tasks should be carried out: **1. Identify Requirement for Change and Justify** a. Complete Change Request complete with justification b. Maintain Change Register c. Following changes are subjected to change control: i. Changes that significantly increase risks or changes to well objectives, trajectory, pressures, etc. ii. Changes in material specifications or requirements including surplus materials or cancellation charges iii. Changes the cost by USD$0.5M d. Proposed changes should be carefully thought through and the change proposer should be prepared to substantiate the change including the gains to be made, the resources required and the impact of not making the change. **2. Engineer Change** a. Engineer change in accordance with the Well Construction Standards, wherever possible, changes are engineered to the same level of details as the original design b. Carry out hazard analysis and risk mitigation in accordance with Risk Management Activity c. Prepare programme revision if engineer change **3. Record and Disseminate Change** a. Update the Change Register and e-mail all persons details of the change b. Record learning experience in Knowledge Database if applicable (Knowledge Management Activity). **Any changes made to the Cementing and Suspension programme should have been the subject of a documented Risk Assessment.**
Mar'09	11th: **PTTEPAA issued *WCCCF to PTTEPAA DSUP proposing to replace the cement plug with a 9 5/8" PCCC installed on 9 5/8" MLS & 13 3/8" PCCC installed on 13 3/8" MLS**	*EV0000802. The Expert concludes that this is an **internal** submission by PTTEPAA.	A request to suspend the well in 2 stages was submitted to the NT on 6 March 2009 and based on preliminary approval, PTTEPAA proceeded to install the 9 5/8" PCCC on 7 March 2009. This WCCCF, issued on 11 March 2009, to replace the cement plug with the 9 5/8" PCCC, was issued only after the well had been capped by the installation of the 9 5/8" PCCC on 7 March 2009. **The fact that the WCCCF was only issued after the operation has been executed is a deviation from PTTEPAA's Change Management Process.**	
	WCCCF was approved the same day by PTTEPAA WCM			
	PTTEPAA SSM issued a letter to NT DoR, requesting approval to perform *Stage 2 suspension of Montara H1-ST1 Well. PTTEPAA did not install the 13 3/8" PCCC.	** Stage 2: Recover 13 3/8" csg above MLS and install 2nd PCCC The adoption of the 2 stage suspension arrangements led to a cost saving of US$50,000 in rig time (time taken to set plug versus time taken to set suspension cap + cost of suspension cap).* *EV0000038		
	13th: NT DoR emailed PTTEPAA SSM and approved the suspension of the H4 well and perform Stage 2 suspension on the GI ST-1 well and the H1 -ST1.	*EV0000040		
	PTTEPAA approved the *Well Construction Standards, version 2	This is an internal submission by PTTEPAA		
	15th: PTTEPAA DSUP issued a PTTEPAA Management Standard for the construct, services or abandon well process. However the status of this standard was reflected as "not approved."	*EV0000039. This is an internal submission by PTTEPAA		
	17th: PTTEPAA advised NOPSA of the change of name from Coogee Resources (Ashmore Cartier) Pty Ltd to PTTEP Australasia (Ashmore Cartier) Pty Ltd.			
	25th: PTTEPAA Extra DSPR arrived on the WA to supervise offline* work , which included the suspension of Montara WHP wells.	**According to PTTEPAA, "offline" work was any work on a well, or wells that could be undertaken concurrently with drilling operations on the adjacent H2 and H3-ST1 wells.*		

Apr'09	3rd	**WA *recovered the BOP on the H1-ST1 well, and transferred it to the H3-ST1 well.**	*- Installed back BOP onto H1-ST1 for storage on 20 Mar 09. (DDR H4 Report #21, dated 20th Mar 2009). *EV0000611 - Removed BOP from H1-ST1 and transferred to H3-ST1 on 3 Apr 09. (DDR H3 ST1 Report #8, dated 3rd Apr 2009) *EV0000583*		
		The following operations were carried out on well H1-ST1 as recorded on PTTEPAA DDRs in the column 'Comments and Lessons Learned'. *13 April 2009 - "Laid out H1 340mm casing stump and running tool." (EV0000566)* *14 April 2009 - "H1 & H3 ST1 340mm casing removed above MLS." (EV0000567)* *15 April 2009 - "H1 & H3 ST1 340mm casing removed above MLS." ... "H1 & H3 ST1 508mm casing ported joints removed from above MLS." (EV0000568)* *16 April 2009 - "Corrosion caps fitted to 340mm MLS and trash caps fitted to 508mm conductors on H1 and H3-ST1." (EV0000569)* ***From Montara WHP Report, sent by WA DSPR to PTTEPAA WCM and DSUP, under the heading Comments/Activities,*** *13 April 2009 - "B/O 340mm MLS and laid out same with 340mm casing joint on well H1." (EV0000044)* *15 April 2009 - "Rigged up and B/O 508mm ported conductor joint on H1 and H3-ST1 — Ok. Corrosion caps and trash caps should be installed by late afternoon." (EV0000048)*		On 6 March 2009, PTTEPAA submitted an application to suspend H1-ST1 in accordance to **Drilling Programme TM-CR-MON-B-150-0001 REV2, hereafter known as "REV2"**, submitted and approved on **21 November 2008**. It is observed that REV2 was issued for use on 6 January 2009 and Mr Marozzi from the NT acknowledged receipt of this document on **12 January 2009**. Pg 44 of 75 in REV2 describes the installation of the 13 3/8" PCCC to be a **RIG ACTIVITY.** On 12 March 2009, PTTEPAA submitted an application to perform Stage 2 suspension on H1-ST1 in accordance to REV2. NT approval of Stage 2 suspension was given on **13 March 2009.** **There has been no mention, in any of the applications submitted to the NT, to suggest that H1-ST1 well suspension would be an OFFLINE activity.** **This has been observed to be a deviation from the NT DA approvals.**	
	15th	**PTTEPAA Extra DSPR supervised WA drilling personnel to remove the 20" and 13 3/8" casings above the MLS hanger.**	*EV0000568, PTTEP DDR H2 13#		
	16th	***PTTEPAA Extra DSPR supervised WA drilling personnel to install a 20 " trash cap over the 20" MLS hanger. The trash cap hid the 13 3/8" MLS hanger from sight thus, the 13 3/8" MLS PCCC was not installed in the H1-STI Well.**	*EV0000569 states "Corrosion caps fitted to 340mm MLS and trash cap fitted to 508mm conductors on H1 and H3-ST1"		
	21st	PTTEPAA released WA from drilling operations on the Montara WHP after suspending all of the wells. No Changes were made to the wells after suspension. (21 Apr - 18 Aug 2009)			
May'09		PTTEPAA issued to NOPSA the Montara Development Construction and Installation Safety Case, WHP and Subsea Installation, Hookup and Pre-commissioning Revision, Rev.2	*EV0000049 states 13 3/8" PCCC had been installed		
Jun'09		PTTEPAA issued for use the Montara Phase 1B Drilling and Completion Program, Revision 0.	*EV0000051	The following deviation have been observed from the review of the document "Montara Phase 1B Drilling and Completion Program" Document Number TM-CR-MON-B-150-0003 REV0, hereafter known as "**1B Drilling Programme**", issued for use on **30 June 2009.** 1) **Pg 15 of 223, Section 2.1.2, Final Paragraph:** "Offline the 340mm (13 3/8") casing was backed out at the MLS and a pressure containing cap was installed. The 508mm (20") conductor was backed out at the MLS and a trash cap was installed." **This information is a deviation from the NT's approval on H1-ST1 well where no 13 3/8" PCCC had been installed as stated above.** 2) **Section 7, Suspension Diagram - As Built Page 2:** The As-Built Suspension Diagram shows the installation of a 13 3/8" PCCC installed. **This information is a deviation from the NT's approval on H1-ST1 well where no 13 3/8" PCCC had been installed as stated above.** **3) Section 7, H1-ST1 Datum Adjustment Worksheet:** The worksheet wrongly represented that a surface annular seal exists on the 9 5/8" x 13 3/8" annulus. Also cement was shown to exist in the shoe track, rat hole and annulus space around the casing shoe when clearly the cement was over displaced. **This information is a deviation from what had physically occurred on the H1-ST1 well since PTTEPAA had overdisplaced the well by 9bbl of uninhibited seawater subsequent to the rapid pressure rise to 1300psi and additional flowback.**	**A documented Risk Assessment** should have been conducted to establish the **WELL INTEGRITY CONDITION of the H1-ST1 wellbore** at the end of Stage 1 and Stage 2 suspension, in preparation of the **1B Drilling Programme** in view of the following reasons: 1. 9 5/8" floats failed and additional 7 bbl of flow back observed 2. 9 5/8" casing cement had to be re-displaced 3. Re-displaced cement barrier had not been verified 4. Surface pressure after the WOC period leaked from 1200psi to 647psi 5. No pressure test on the 9 5/8" PCCC had been conducted **A comprehensive Risk Assessment Process would have identified the 'wet shoe' on a horizontal production casing inside the hydrocarbon reservoir as a High Risk event potential.**
Jul'09		PTEPAA approved Well Construction Standards, version 3 applicable to all aspects of well design, well construction and well servicing and well management.	*EV0000096		
Aug'09	4th	ATLAS issued Safety Case Revision document for NOPSA review and acceptance. The document was prepared by both PTTEPPA and ATLAS.	*EV0000055		
	7th	PTTEPAA supervised installation of Montara WHP production topsides on Montara WHP jacket.			
	12th	PTTEPAA WCM approved the Well Construction Management Framework standard. However the status of this standard was reflected as "not approved".	*EV0000050		
	17th	WA returned to Montara WHP	*EV0000554		
	18th	PTTEPPA WCM emailed the Montara WHP Construction Schedule, a one page project plan, to key appointment holders.	*EV0000056		
	19th	WA WOW before they hulled down and moved the rig into the Montara WHP	*EV0000554, PTTEP DDR H1-ST1 #11		
	9:05am	WA pinned final locaion, completed preload process, moved hull up and final skidded out over the WHP and continued to organise the decks in preparation for 20" conductor running	*EV0000554, PTTEP DDR H1-ST1 #11		
		PTTEPAA instructed WA drilling team to commence Re-Entry of 5 Montara WHP wells in order to drill 8 1/2" section for H1-ST1, H2, H3-ST1 & H4. → **H1-ST1 RE-ENTRY STAGE**	*EV0000554, PTTEP DDR H1-ST1 #11		

2.5 Timeline - Re-entry Stage

Assumed Facts - Montara Wellhead Platform @ H1-ST1 Re-Entry Stage		PTTEPAA Unapproved Deviation from NTDA Approvals/Change Management	Risk Assessment Opportunities In the Expert's Opinion
	PTTEPAA instructed WA drilling team to commence Re-Entry of 5 Montara WHP wells in order to drill the 8 1/2" section for H1-ST1, H2, H3-ST1 & H4.		
19th	PTTEPAA issued Montara Platform Forward Plan number 1b-20" tie back for 19 Aug 2009, Version 2.0 — **The objective was to get on location and tie back all the 20" conductors. *EV0000058*		**A documented Risk Assessment** should have been conducted to establish the **WELL INTEGRITY CONDITION of the H1-ST1 wellbore** at the end of Stage 1 and Stage 2 suspension, in preparation of the **1B Drilling Programme** in view of the following reasons: 1. 9 5/8" floats failed and additional 7 bbl of flow back observed 2. 9 5/8" casing cement had to be re-displaced 3. Re-displaced cement barrier had not been verified 4. Surface pressure after the WOC period leaked from 1200psi to 647psi 5. No pressure test on the 9 5/8" PCCC had been conducted **A comprehensive Risk Assessment Process would have identified the wet shoe on a horizontal production casing inside the hydrocarbon reservoir as a High Risk event.**
11:57am	PTTEPAA DSUP *emailed WA DSPR and WA LOG — **PTTEPAA DSUP realises that the PTTEP SCR existed and was not sure if the recipients of his email were aware of the same information. He also stated that he had yet to read it. *EV0000059*		
20th	WA RO issued WA Personnel POB list covering the 24h period from midnight on 19 Aug to 20 Aug 2009. No other POB was issued for this list. — **EV0000062*		
3:30am	WA removed the Montara WHP facility helideck's hatch cover for H1-ST1 well — **EV0000555, PTTEP DDR H1-ST1 #12*		
4:30am	WA skidded over H1-ST1 well in preparation to remove 20" MLS trash cap, 13 3/8" MLS PCCC and 9 5/8" MLS PCCC, in accordance with Montara Phase 1B Drilling & Completion Program Rev0. — **EV0000555, PTTEP DDR H1-ST1 #12*		
4:40am	WA skidded its drilling package so that its RT was over the H1-ST1 well. — **EV0000555, PTTEP DDR H1-ST1 #12*		
6:00am	**WA drilling crew removed the 20" MLS trash cap from H1-ST1 well and found out that there was *no 13 3/8" MLS** — **EV0000555, PTTEP DDR H1-ST1 #12*	As defined by PTTEPAA's Well Construction Management Framework, the discovery of the missing 13 3/8" PCCC beneath the 20" Trash cap should have triggered a Change Management Process, as it is a change that "significantly increase risks or changes to well objectives, trajectory, pressures, etc.", and could potentially be "a change in material specifications or requirements including surplus materials or cancellation charges". **The discovery of this missing 13 3/8" PCCC from the well, in deviation from NT's approval for an installed 13 3/8" PCCC as per the Stage 2 Suspension Plan, was not captured by PTTEPAA's Change Management.**	At this stage, the forward plan in the Expert's opinion should have stopped and a documented Risk Assessment should have been conducted. **In the Expert's opinion, the outcome of the Risk Assessment under Good Oilfield Practice would have concluded that a Risker and BOP should have ben installed prior to removal of the 9 5/8" PCCC.**
	***PTTEPAA instructed WA drilling crew to remove 9 5/8" MLS PCCC from H1-ST1 well.** — ** *EV0000555, PTTEP DDR H1-ST1 #12*		
	Issued a **supplementary plan** to the Montara Platform Forward Plan number 1b-20" tie back for 19 Aug 2009 Version 2.0. — ** *EV0000758*		
11:30am	9 5/8" MLS PCCC was removed from H1-ST1 well after testing for signs of pressure under PCCC. — **EV0000555, PTTEP DDR H1-ST1 #12*		
12:00pm	13 3/8" CSG thread cleaning tool was run into the 13 3/8" MLS hanger on DP and thread cleaning operations commenced. — **EV0000555, PTTEP DDR H1-ST1 #12*		
1:30pm	Upon *completion of 13 3/8" CSG thread cleaning, the 20" conductor riser was run and installed on H1-ST1. The conductor was then rough cut at the WH deck level and WA drilling package skidded from its position over to G1-ST1 well. — **EV0000555, PTTEP DDR H1-ST1 #12*		**A Risk Assessment and an assessment of the Well Integrity Status of H1-ST1 post suspension at this stage**, would have concluded that prior to moving the rig away and ONLY if the well was confirmed stable: - The PCCC should have been re-installed - A second surface barrier should have been installed, either a pressure containing 13 3/8" PCCC or a BOP. **The well should have been under a 24 hour monitoring while the rig moved away since the well had zero barriers, which clearly it was not.**
	9 5/8" MLS PCCC was not re-installed.		
5:00pm	Drilling derrick of WA skidded over to G1-ST1 to commence tie back of 20" CSG riser — **EV0000527, PTTEP DDR G1 ST1 #16*		
6:30pm	WA drilling crew removed 20" trash cap from G1-ST1 well — **EV0000527, PTTEP DDR G1 ST1 #16*		
Aug'09	WA tied back existing 20" conductor in the G1-ST1 well and cold cut it 4.5m above mezzanine deck level of Montara WHP. — **EV0000527, PTTEP DDR G1 ST1 #16*		

	21st 12:00am	Drilling derrick of WA skidded over to H4 well to *commence tie back of the 20" CSG riser.	*EV0000612, PTTEP DDR H4 #22
	5:38am	While tying back H4 well, it was identified that H1-ST1 well was flowing (liquid).	*EV0000612, PTTEP DDR H4 #22
	5:40am	WA reported to JC that a gas alarm sounded triggered by the flow of liquids.	*EV0000612, PTTEP DDR H4 #22
	5:44am	WA instructed JC to stop all hot works.	*EV0000612, PTTEP DDR H4 #22
	5:55am	Flow from well was temporary and subsided after 40 to 60bbl. Sample of liquid ejected was collected and identified to be crude oil.	*EV0000612, PTTEP DDR H4 #22
	6:00am	PTTEPAA offshore SPR, WCM and WA OIM decided to skid WA drilling package over to H1-ST1 well in order to run and set a 9 5/8" RTTS packer to provide a barrier to flow. WA reported to JC that she is continuing investigations into the gas alarm and will advise when completed.	
	6:42am	WA reported to JC that there is a HC release onto the drilling flow in the form of a 'burp'.	*EV0000612, PTTEP DDR H4 #22
	7:23am	Before skidding operations could start, H1-ST1 started flowing again. Oil & Gas was blowing into the underside of the WA rig floor.	*EV0000612, PTTEP DDR H4 #22 *EV0000612, PTTEP DDR H4 #22
	7:25am	WA OIM ordered the activation of the general alarm on the WA and instructed all personnel to go to their emergency muster station on WA.	*EV0000612, PTTEP DDR H4 #22
	7:45am	WA advised JC of an uncontrolled release of hydrocarbons and JC advised crew to clear decks.	*EV0000612, PTTEP DDR H4 #22
		General Muster Alarm Sounded	
	7:25am	PTTEPAA senior SPR and WA OIM agreed and ordered the the evacuation of 52 non essential personnel and JC to move away from the Montara WHP due to risk to health and safety of any person at or near facilities	*EV0000612, PTTEP DDR H4 #22
		17 personnel stayed on WA with the intention of regaining control of the well. However it was quickly apparent to WA OIM and PTTEPAA Offshore SPR that they had a blowout. These 17 personnel were safely evacuated as well.	*EV0000612, PTTEP DDR H4 #22
	8:45am	WA Rig Manager informed NOPSA of the uncontrolled release of hydrocarbons from the H1-ST1 wells and of the emergency evacuation of all personnel from the Montara WHP and WA facilities.	
	25th	PTTEP issued an incident notification to NOPSA relating to the Montara H1-ST1 well release.	
Oct'09		PTTEP issued an incident report to NOPSA relating to the Montara H1 ST1 well release.	
Jun'10		PTTEP issued the updated incident report to NOPSA relating to the H1 ST1 well release.	

3. WAiT© Analysis

The Expert has used a Well Assessment integrity tool (WAiT©) by Stuart Wright Pte Ltd to analyze and illustrate the Well Integrity condition of H1-ST1 at key stages (represented in 2 Charts) of Well Construction & Suspension and Re-entry.

- WAiT© #1 – Well Integrity Status of H1/H1-ST1 from TD 12 ¼" to Stage 2 Suspension
- WAiT © #2 – Well Integrity Status of H1-ST1 from Re-Entry to Blowout

For WAiT© #1 there are 13 key operational stages, and for WAiT© #2 there are 5 key operational stages. Each key stage contains a separate montage describing the Well Integrity status based on the facts, and concludes with the Expert's opinion as to the Well Integrity condition at that stage.

Each stage contains the following details:

1. TVD/MD depths
2. Montara Lithology
3. Date and Time of Events
4. Well Architecture
5. Well Trajectories
6. Surface Equipment Schematic
7. Legends and References
8. Schematic of Downhole Well Conditions
9. As Built well facts as defined by NOPSA document Assumed Facts and DDRs
10. Expert's Opinion of Well Integrity Condition for:
    a. Primary Barriers
    b. Secondary Barriers

3.1 WAiT © #1 – Well Integrity Status of H1/H1-ST1 from TD 12 ¼" to Stage 2 Suspension

WAiT© #1 includes:

1. WI Status of H1 Well at 12-1/4" Hole Section TD
2. WI Status of H1 well at Plug & Abandonment
3. WI Status of H1-ST1 Well at 12-1/4" hole TD
4. WI Status of H1-ST1 Well, Running 9-5/8"Casing to TD
5. WI Status of H1-ST1 well at 9-5/8" casing plug bump with FCP 1375 psi
6. WI Status of H1-ST1 well during 9-5/8" casing Pressure Test
7. WI Status of H1-ST1 well after 9-5/8" casing Pressure test and bleed off
8. WI Status of H1-ST1 well at 9-5/8" Casing Float Failure
9. WI Status of H1-ST1 well at 9-5/8" Casing Float Failure and Backflow
10. WI Status of H1-ST1 Well, after overdisplacement of 16bbl of SW back into 9-5/8" casing
11. WI Status of H1-ST1 Well, Post Overdisplacement
12. WI Status of H1-ST1 at Stage-1 Suspension
13. WI Status of H1-ST1 at Stage 2 Suspension

3.1.1 WI Status of H1 Well at 12-1/4" Hole Section TD

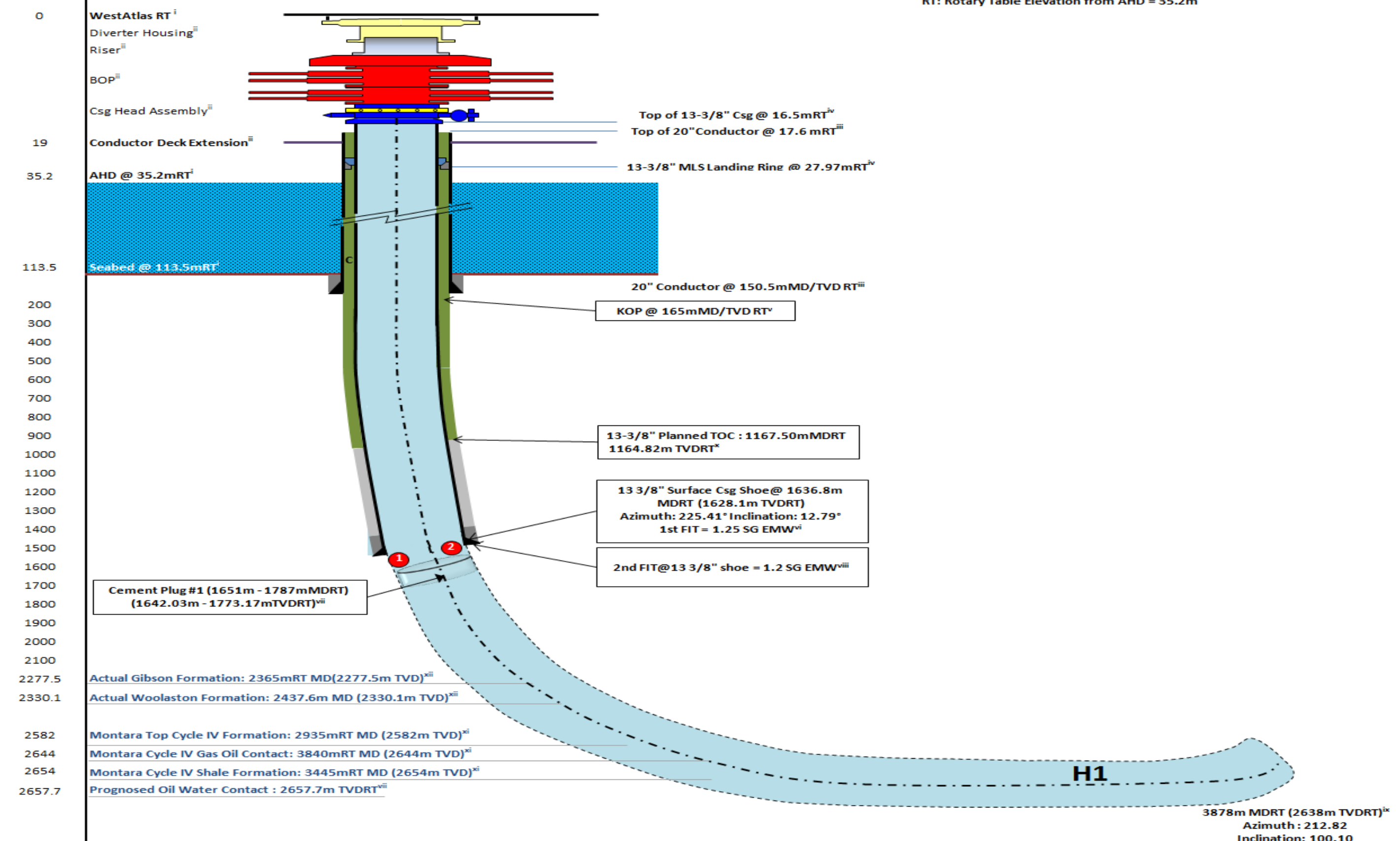
SW ISO Doc Number:	XLS-30291-NOPSA-001
Prepared By:	[illegible]
Reviewed By:	Colin Stuart
Date:	16-Feb-12
Revision Number:	1

INVESTIGATION INTO THE UNCONTROLLED RELEASE OF HYDROCARBONS FROM THE MONTARA WELLHEAD PLATFORM ON THE 21 AUGUST 2009
EXPERT WITNESS REPORT

WAiT© #1- Well Integrity Status of H1/H1-ST1 from TD 12 ¼" to Stage 2 Suspension

TVDRT (m) | **WI Status of H1 Well at 12-1/4" Hole Section TD (Panel 1 of 13)** | **27-Feb-09**

RT = RKB, All TVD measurements are with reference to RT
RT: Rotary Table Elevation from AHD = 35.2m



Note: Texts in BLUE are Expert Witness (EW) calculated values

References		
#	NOPSA Doc No.	Description
i	EV0000530	Daily Drilling Report, H1 (#3)
ii	EV0000614	GI, H1 & H4 (Batch Drilled) Drilling Program Rev 2
iii	EV0000529	Daily Drilling Report, H1 (#2)
iv	EV0000534	Daily Drilling Report, H1 (#7)
v	EV0000530	Daily Drilling Report, H1 (#3)
vi	EV0000536	Daily Drilling Report, H1 (#9)
vii	EV0000614	GI, H1 & H4 (Batch Drilled) Drilling Program Rev 2, Appendix 6 Directional Program.
viii	EV0000538	Daily Drilling Report, H1 (#11)
ix	EV0000543	Daily Drilling Report, H1 (#16)
x	EV0000801	Change Control D65005A 003
xi	DB-30291-NOPSA-404	PTTEP Document Submission - Regulatory Approvals#3
xii	DB-30291-NOPSA-359	Actual TVD of formation tops for H1 ST1 , H4 and GI ST1

Legend	
	Description
C	Annulus Space between 20" conductor and 13 3/8" Csg
KOP	Kick off point
1	Downhole losses occurred between 1706 -1787mMDRT (1695.38 - 1713.68m TVDRT). Total losses: 1359 bbls ($216m^3$)[vi]
2	FIT @ 1636.8mMDRT (1628.1mTVDRT): 1.2sg EMW[viii]

WAiT© Well Integrity Analysis

"As Built" Well Facts to H1 TD 12-1/4" Hole

26" Hole (20" Conductor)
1) Drilled 660mm (26") hole to 155m.
2) Ran 20" conductor to 150.5m, Performed inner string cementing, WOC for 3.5h
3) Cut 20" Conductor at 17.6m MDRT.

17-1/2" Hole (13-3/8" Casing)
4) Commenced drilling 17-1/2" OH from 150.5m,kicked off at 165m MDRT.
5) Observed hi torque and total losses while drilling at 955m.
6) Observed partial to total losses at from 955m MDRT to 1060m MDRT.
7) 17 1/2" section TD at 1644m MDRT.
8) Ran 13 3/8" Casing to 1636.81m MDRT, Landed MLS @ 27.97m MDRT
9) Pumped 225.8 bbls (35.9m3) Lead slurry and 78.87bbls (12.54m3) Tail.
10)Displaced with seawater and bumped plug at 984psi (6784kPa).
11) Returns lost between 2526 and 3400 strokes. Otherwise, good returns.
12) Ptest 13 3/8" CSG to 3000psi (20,684kPa)/15 min. Good test, floats holding.
13) Rough cut 13-3/8" casing at ~16.5m MDRT

12-1/4" Hole
14) Completed BOP testing and drilled out 13-3/8" shoe track.
15) Performed FIT = 10.41ppg (1.25sg) EMW.
16) Static and dynamic downhole losses occurred between 1706 -1787mMDRT.
17) Total losses recorded was 1359bbls (216m3).
18) Set balanced cement plug 1786-1617m MDRT, no losses observed.
19) Squeezed 3.18m3 of cement. Flow checked, well flowed and became static.
15) Tagged cement at 1651m MDRT.
16) Drilled out cement plug. Performed FIT @ casing shoe = 10ppg (1.20SG)
17) Drilled directionally 1820m-3878m MDRT, with no losses. Max gas = 18%

Well Integrity Condition

Primary Well Barrier(s) with respect to Actual Montara Cycle IV Formation as per SECTION 5.8.3, NORSOK D-010 STANDARD, REV 3, AUGUST 2004

Element	Assessment	Traffic Light
1) Hydrostatic column	Drilling fluid (1.20sg) hydrostatic column exhibits 514 to 587psi overbalance to reservoir pressure ASSUMING a range of 1.04sg to 1.06sg at Top Cycle IV reservoir.	Green

Secondary Well Barrier(s) with respect to Actual Montara Cycle IV Formation as per SECTION 5.8.3, NORSOK D-010 STANDARD, REV 3, AUGUST 2004

Element	Assessment	Traffic Light
1) 13-3/8" x 20" TOC	TOC between 13-3/8" x 20" (C Annulus) had not been verified by logs or post cement job calculations. Should permeable zones exist within the unsealed "C" annulus (open shoe), and subsequent reduction of drilling fluid hydrostatic contained in the annuli, due to barite drop out occurring in the forseeable future, potential phenomena of Sustained Casing Pressure (SCP) cannot be ruled out.	Amber
2) 13-3/8" Casing	Pressure tested to 3,000psi (20,684 kPa) for 15 min. Verified Barrier.	Green
3) BOP	BOP had been tested to 500psi (3.45 MPa) x 5 min (LOW) and 4000psi (27.58MPa) 10min (HIGH) on 19 February 2009. Next Test date 12 March 2009.MSIWHP (Max Shut In Wellhead Pressure), Ref: EV0000073 = 3500 psi.	Green

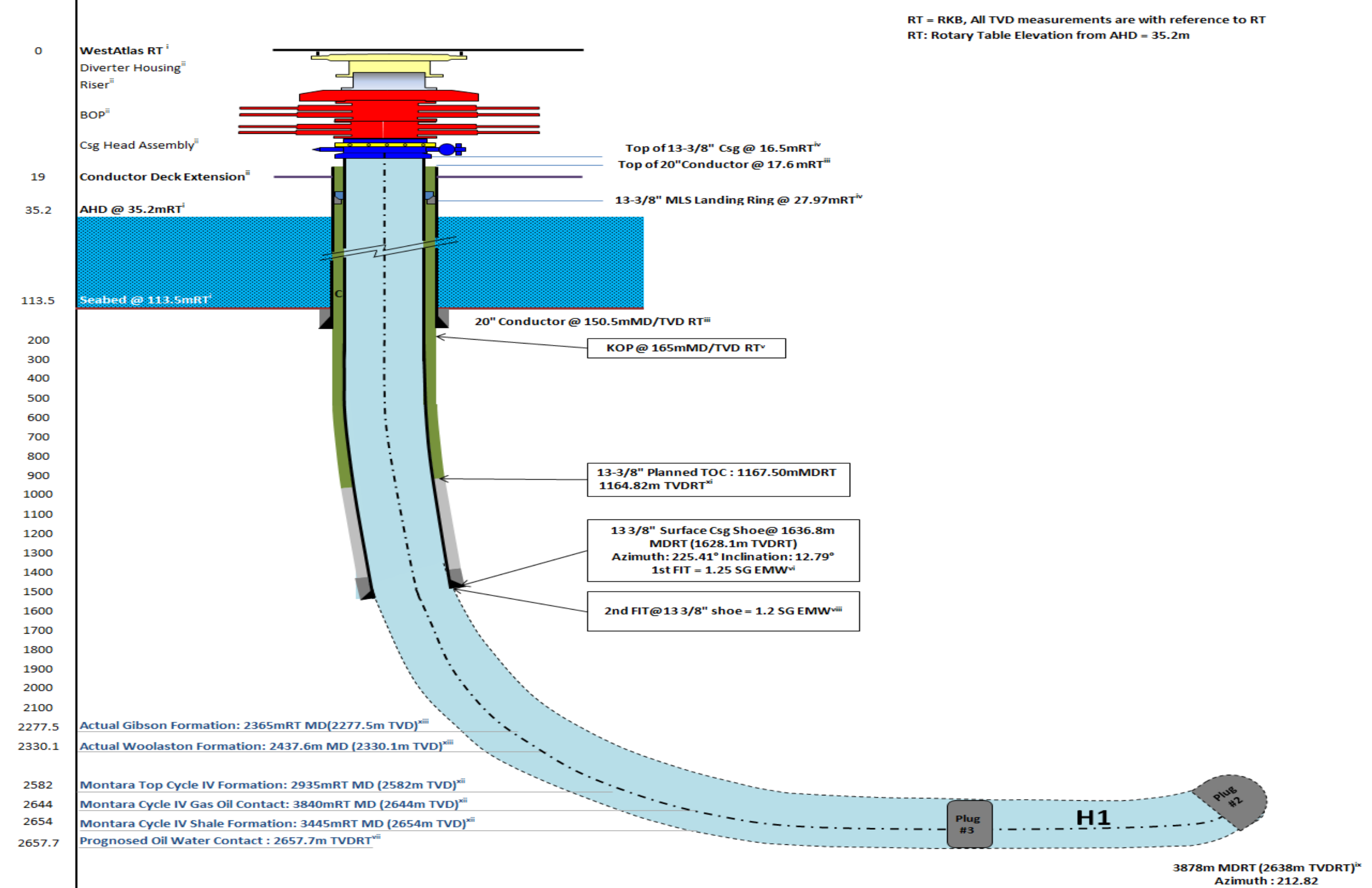
3.1.2 WI Status of H1 well at Plug & Abandonment

SW ISO Doc Number:	XLS-30291-NOPSA-001
Prepared By:	Myo Kyaw Thu/ Linus Lim/ Sean Foo/ Yeo Min
Reviewed By:	Colin Stuart
Date:	16-Feb-12
Revision Number:	1

INVESTIGATION INTO THE UNCONTROLLED RELEASE OF HYDROCARBONS FROM THE MONTARA WELLHEAD PLATFORM ON THE 21 AUGUST 2009 EXPERT WITNESS REPORT

WAiT© #1- Well Integrity Status of H1/H1-ST1 from TD 12 ¼" to Stage 2 Suspension

TVDRT (m) | **WI Status of H1 well at Plug & Abandonment (Panel 2 of 13)** | **1-Mar-09**



Note: Texts in BLUE are Expert Witness (EW) calculated values

References		
#	NOPSA Doc No.	Description
i	EV0000530	Daily Drilling Report, H1 (#1)
ii	EV0000614	GI, H1 & H4 (Batch Drilled) Drilling Program Rev 2
iii	EV0000529	Daily Drilling Report, H1 (#2)
iv	EV0000534	Daily Drilling Report, H1 (#7)
v	EV0000530	Daily Drilling Report, H1 (#3)
vi	EV0000536	Daily Drilling Report, H1 (#9)
vii	EV0000614	GI, H1 & H4 (Batch Drilled) Drilling Program Rev 2, Appendix 6 Directional Program.
viii	EV0000538	Daily Drilling Report, H1 (#11)
ix	EV0000543	Daily Drilling Report, H1 (#16)
x	EV0000544	Daily Drilling Report, H1 (#17)
xi	EV0000801	Change Control D65005A 003
xii	DB-30291-NOPSA-404	PTTEP Document Submission - Regulatory Approvals#3
xiii	DB-30291-NOPSA-359	Actual TVD of formation tops for H1 ST1 , H4 and GI ST1

Legend	
	Description
C	Annulus Space between 20" conductor and 13 3/8" Csg
KOP	Kick off point
Plug #2	3728 - 3878m MDRT (2649 - 2639 mTVDRT)[x]
Plug #3	3130-3310m MDRT (2630.3 - 2650m TVDRT)[x] Inclination at Top Plug #3= 82deg

WAiT© Well Integrity Analysis

"As Built" Well Facts to H1 TD and abandonment

12-1/4" Hole

1) Plugged back well with Plug#1 from 3878-3728m MDRT 72bbls (11.44m3).
2) Displaced with 9.91ppg (1.19sg) drilling fluid(243bbl), bled of residual pressure, no back-flow.

3) Circulated bottoms up, Max gas observed = 3.4%.
4) Plugged back well with Plug#2 from 3310-3160m MDRT. 90bbl (14.3m3).
5) Displaced with 9.91ppg (1.19sg) drilling fluid (207.5bbl), bled of residual pressure, no back-flow.

6) Circulated bottoms up, Max gas observed = 2.5%
7) Tagged firm cement at 3130m MDRT, with 8.9t, commenced side-track.

Well Integrity Condition

Primary Well Barrier(s) with respect to Actual Montara Cycle IV Formation as per SECTION 5.8.3, NORSOK D-010 STANDARD, REV 3, AUGUST 2004

Element	Assessment	Traffic Light
1) Hydrostatic column	Drilling fluid (1.20sg) hydrostatic column exhibits 514 to 587psi overbalance to reservoir pressure ASSUMING a range of 1.04sg to 1.06sg at Top Cycle IV reservoir.	[green light]
Cement Plug #2	The top of plug is at 3728m MDRT (2649m TVDRT), is 793m below the top of the Cycle IV formation (2582 - 2657.7m TVDRT). After plug#1 was set, the subsequent bottoms up circulation indicated a maximum gas reading of 3.4%. The open hole plug #2 had not been tagged to confirm the depth of firm plug. Nor had the plug been tested in the direction of flow or from above. Hence the integrity of plug#2, cannot be established, nor is the function of #2 understood by Expert Witness. Since plug #2 is only a barrier to hydrocarbon below it and not to the 793 m hydrocarbon reservoir above the plug #2.	[red light]
Cement Plug #3	The top of plug is at 3130 mMDRT (2630.3m TVDRT), and is 195m below the top of Montara Cycle IV formation (2582 - 2657.7m TVDRT). Plug #3 is only a barrier to hydrocarbon below it and not to the 195 m hydrocarbon reservoir above the plug #3. After the plug was set the subsequent bottoms up circulation indicated 2.5% maximum gas observed. The integrity of plug#3 as a barrier to hydrocarbons is only relevant to limiting uncontrolled flow rate but not as a barrier by itself.	[red light]

Secondary Well Barrier(s) with respect to Actual Montara Cycle IV Formation as per SECTION 5.8.3, NORSOK D-010 STANDARD, REV 3, AUGUST 2004

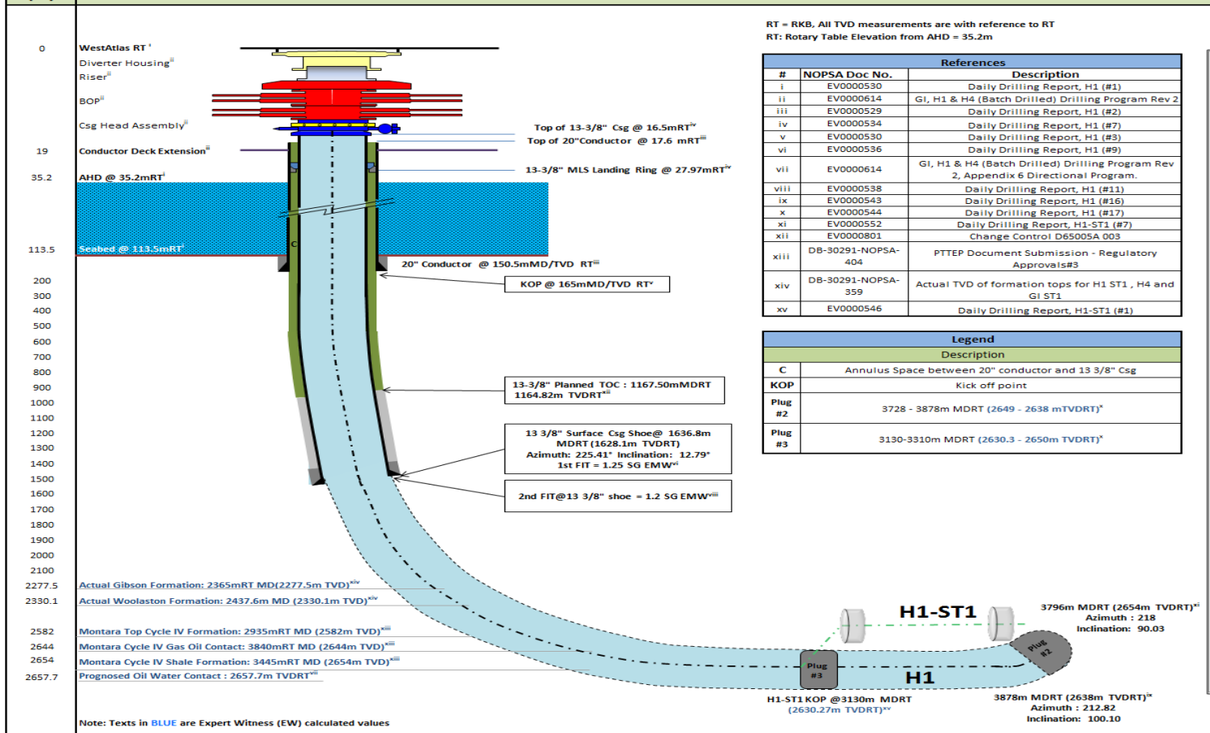
Element	Assessment	Traffic Light
1) 13-3/8" x 20" TOC	TOC between 13-3/8" x 20" (C Annulus) had not been verified by logs or post cement job calculations. Should permeable zones exist within the unsealed "C" annulus (open shoe), and subsequent reduction of drilling fluid hydrostatic contained in the annuli, due to barite drop out occurring in the forseeable future, potential phenomena of Sustained Casing Pressure (SCP) cannot be ruled out.	[amber light]
2) 13-3/8" Casing	Pressure tested to 3,000psi (20,684 kPa) for 15 min. Verified Barrier.	[green light]
3) BOP	BOP had been tested to 500psi (3.45 MPa) x 5 min (LOW) and 4000psi (27.58MPa) 10min (HIGH) on 19 February 2009. Next Test date 12 March 2009.MSIWHP (Max Shut In Wellhead Pressure), Ref: EV0000073 = 3500 psi.	[green light]

3.1.3 WI Status of H1-ST1 Well at 12-1/4" hole TD

SW ISO Doc Number:	XLS-30291-NOPSA-001
Prepared By:	[illegible]
Reviewed By:	Colin Stuart
Date:	16-Feb-12
Revision Number:	1

INVESTIGATION INTO THE UNCONTROLLED RELEASE OF HYDROCARBONS FROM THE MONTARA WELLHEAD PLATFORM ON THE 21 AUGUST 2009
EXPERT WITNESS REPORT
WAiT© #1- Well Integrity Status of H1/H1-ST1 from TD 12 ¼" to Stage 2 Suspension

TVDRT (m) | **WI Status of H1-ST1 Well at 12-1/4" hole TD (Panel 3 of 13)** | **5-Mar-09**

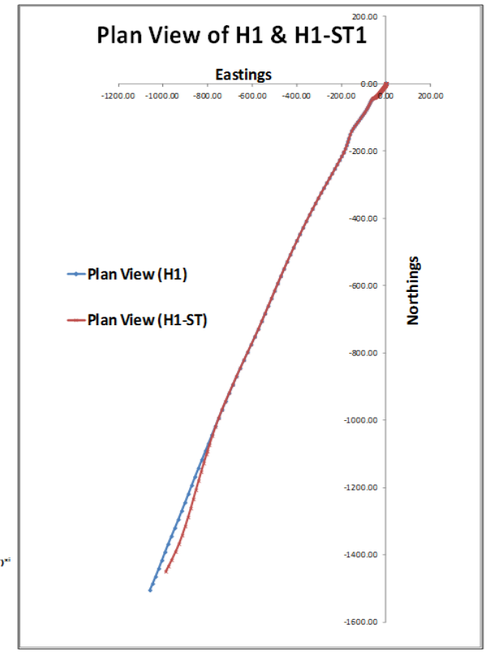


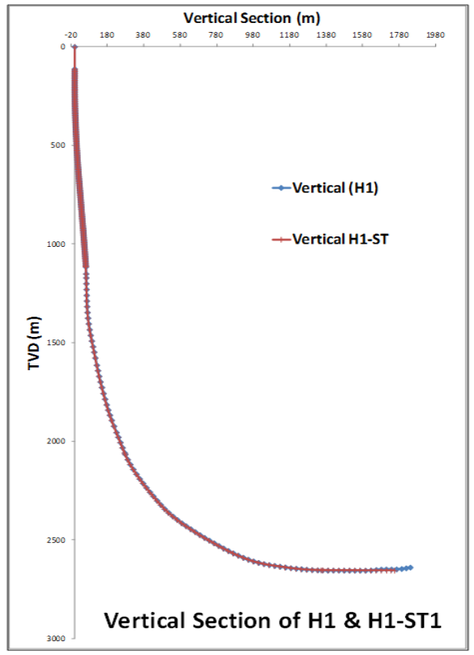
Note: Texts in BLUE are Expert Witness (EW) calculated values

RT = RKB, All TVD measurements are with reference to RT
RT: Rotary Table Elevation from AHD = 35.2m

References		
#	NOPSA Doc No.	Description
i	EV0000530	Daily Drilling Report, H1 (#1)
ii	EV0000614	GI, H1 & H4 (Batch Drilled) Drilling Program Rev 2
iii	EV0000529	Daily Drilling Report, H1 (#2)
iv	EV0000534	Daily Drilling Report, H1 (#7)
v	EV0000530	Daily Drilling Report, H1 (#3)
vi	EV0000536	Daily Drilling Report, H1 (#9)
vii	EV0000614	GI, H1 & H4 (Batch Drilled) Drilling Program Rev 2, Appendix 6 Directional Program.
viii	EV0000538	Daily Drilling Report, H1 (#11)
ix	EV0000543	Daily Drilling Report, H1 (#16)
x	EV0000544	Daily Drilling Report, H1 (#17)
xi	EV0000552	Daily Drilling Report, H1-ST1 (#7)
xii	EV0000801	Change Control D65005A 003
xiii	DB-30291-NOPSA-404	PTTEP Document Submission - Regulatory Approvals#3
xiv	DB-30291-NOPSA-359	Actual TVD of formation tops for H1 ST1 , H4 and GI ST1
xv	EV0000546	Daily Drilling Report, H1-ST1 (#1)

Legend	
Description	
C	Annulus Space between 20" conductor and 13 3/8" Csg
KOP	Kick off point
Plug #2	3728 - 3878m MDRT (2649 - 2638 mTVDRT)*
Plug #3	3130-3310m MDRT (2630.3 - 2650m TVDRT)*





WAiT© Well Integrity Analysis

"As Built" Well Facts to the end of H1-ST1

12-1/4" hole - Sidetracked
1) NT DA approved to sidetrack well H1 and re-named well to H1-ST1.
2) Commenced to sidetrack well from 3130m MDRT
3) Drill out cement and encountered 100% siltstone at 3249m MDRT.
4) H1-ST1 TD at 3796m MDRT, 3m above prognosed OWC at 2657m TVDRT.

Well Integrity Condition

Primary Well Barrier(s) with respect to Actual Montara Cycle IV Formation as per SECTION 5.8.3, NORSOK D-010 STANDARD, REV 3, AUGUST 2004

Element	Assessment	Traffic Light
1) Hydrostatic column	Drilling fluid (1.20sg) hydrostatic column exhibits 514 to 587psi overbalance to reservoir pressure ASSUMING a range of 1.04sg to 1.06sg at Top Cycle IV reservoir.	
Cement Plug #2	The top of plug is at 3728m MDRT (2649m TVDRT), is 793m below the top of the Cycle IV formation (2582 - 2657.7m TVDRT). After plug#1 was set, the subsequent bottoms up circulation indicated a maximum gas reading of 3.4%. The open hole plug #2 had not been tagged to confirm the depth of firm plug. Nor had the plug been tested in the direction of flow or from above. Hence the integrity of plug#2, cannot be established, nor is the function of #2 understood by Expert Witness. Since plug #2 is only a barrier to hydrocarbon below it and not to the 793 m hydrocarbon reservoir above the plug #2.	
Cement Plug #3	The top of plug is at 3130 mMDRT (2630.3m TVDRT), and is 195m below the top of Montara Cycle IV formation (2582 - 2657.7m TVDRT). Plug #3 is only a barrier to hydrocarbon below it and not to the 195 m hydrocarbon reservoir above the plug #3. After the plug was set the subsequent bottoms up circulation indicated 2.5% maximum gas observed. The integrity of plug#3 as a barrier to hydrocarbons is only relevant to limiting uncontrolled flow rate but not as a barrier by itself.	

Secondary Well Barrier(s) with respect to Prognosed Montara Cycle IV Formation as per SECTION 5.8.3, NORSOK D-010 STANDARD, REV 3, AUGUST 2004

Element	Assessment	Traffic Light
1) 13-3/8" x 20" TOC	TOC between 13-3/8" x 20" (C Annulus) had not been verified by logs or post cement job calculations. Should permeable zones exist within the unsealed "C" annulus (open shoe), and subsequent reduction of drilling fluid hydrostatic contained in the annuli, due to barite drop out occurring in the forseeable future, potential phenomena of Sustained Casing Pressure (SCP) cannot be ruled out.	
2) 13-3/8" Casing	Pressure tested to 3,000psi (20,684 kPa) for 15 min. Verified Barrier.	
3) BOP	BOP had been tested to 500psi (3.45 MPa) x 5 min (LOW) and 4000psi (27.58MPa) 10min (HIGH) on 19 February 2009. Next Test date 12 March 2009.MSIWHP (Max Shut In Wellhead Pressure), Ref: EV0000073 = 3500 psi.	

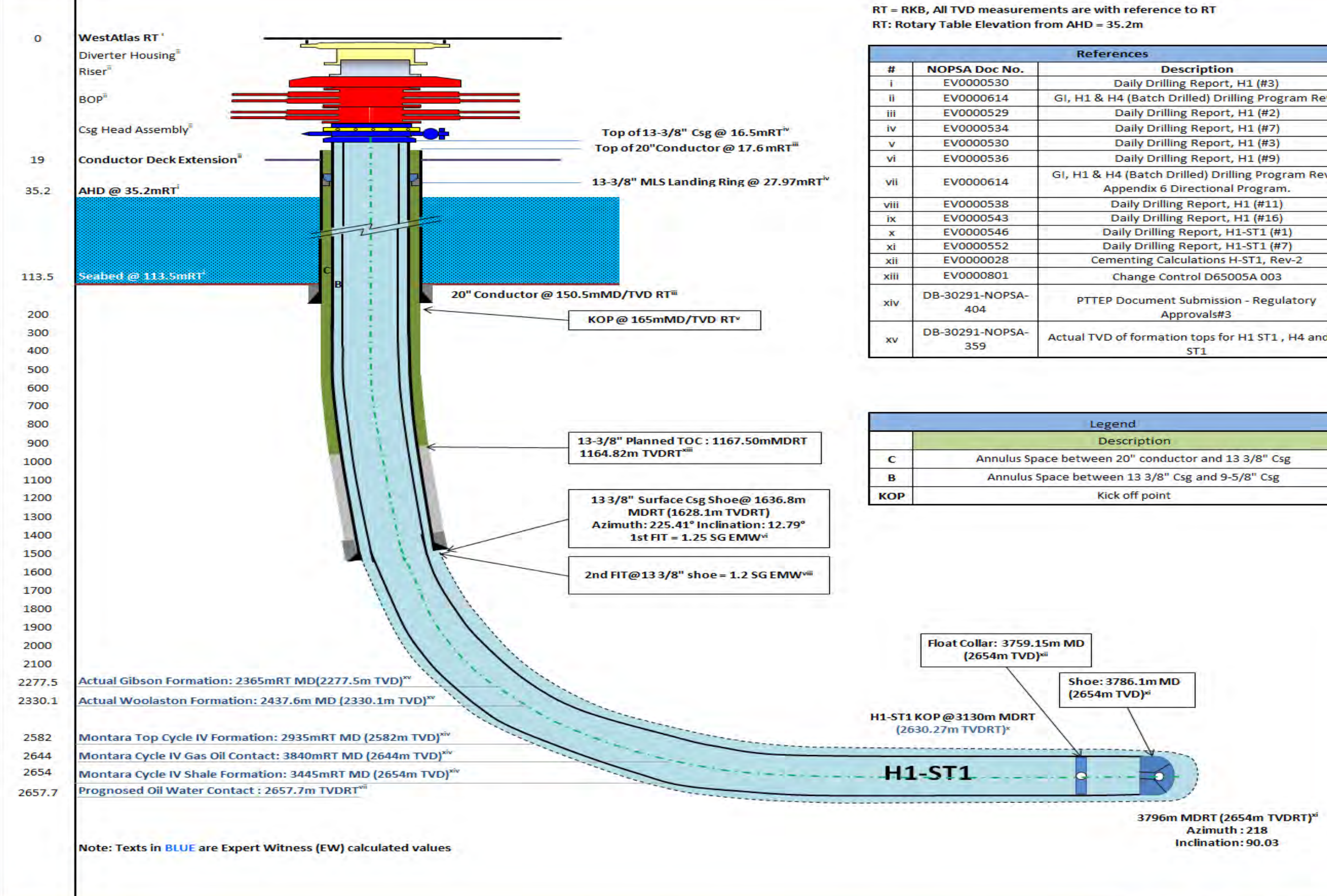
3.1.4 WI Status of H1-ST1 Well, Running 9-5/8"Casing to TD

SW ISO Doc Number:	XLS-30291-NOPSA-001
Prepared By:	
Reviewed By:	Colin Stuart
Date:	16-Feb-12
Revision Number:	1

INVESTIGATION INTO THE UNCONTROLLED RELEASE OF HYDROCARBONS FROM THE MONTARA WELLHEAD PLATFORM ON THE 21 AUGUST 2009
EXPERT WITNESS REPORT

WAiT© #1- Well Integrity Status of H1/H1-ST1 from TD 12 ¼" to Stage 2 Suspension

TVDRT (m) — **WI Status of H1-ST1 Well, Running 9-5/8"Casing to TD (Panel 4 of 13)** — **7-Mar-09**



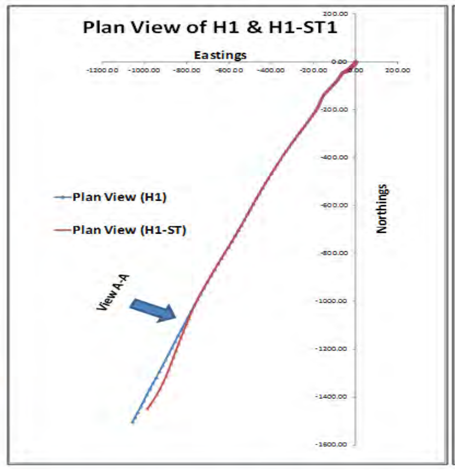
RT = RKB, All TVD measurements are with reference to RT
RT: Rotary Table Elevation from AHD = 35.2m

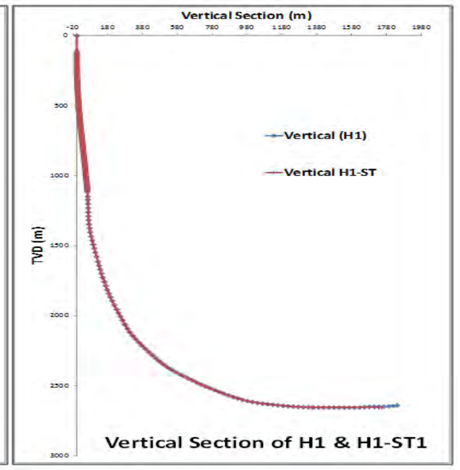
References

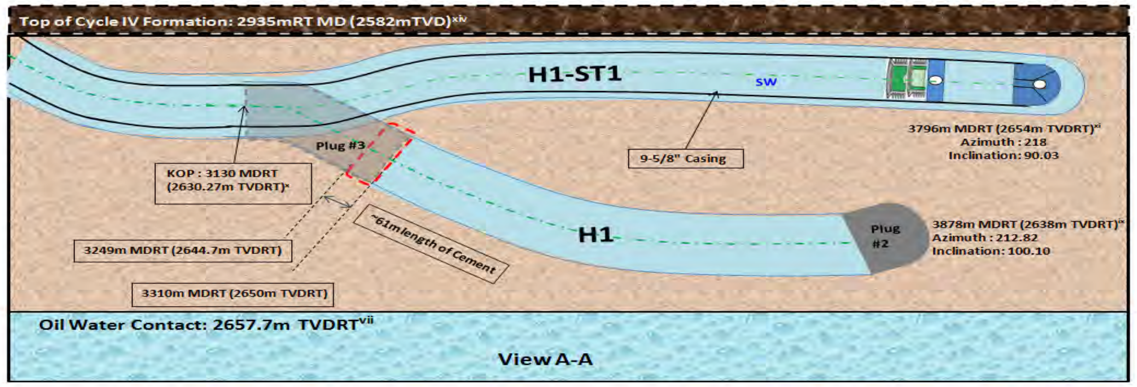
#	NOPSA Doc No.	Description
i	EV0000530	Daily Drilling Report, H1 (#3)
ii	EV0000614	GI, H1 & H4 (Batch Drilled) Drilling Program Rev 2
iii	EV0000529	Daily Drilling Report, H1 (#2)
iv	EV0000534	Daily Drilling Report, H1 (#7)
v	EV0000530	Daily Drilling Report, H1 (#3)
vi	EV0000536	Daily Drilling Report, H1 (#9)
vii	EV0000614	GI, H1 & H4 (Batch Drilled) Drilling Program Rev 2, Appendix 6 Directional Program.
viii	EV0000538	Daily Drilling Report, H1 (#11)
ix	EV0000543	Daily Drilling Report, H1 (#16)
x	EV0000546	Daily Drilling Report, H1-ST1 (#1)
xi	EV0000552	Daily Drilling Report, H1-ST1 (#7)
xii	EV0000028	Cementing Calculations H-ST1, Rev-2
xiii	EV0000801	Change Control D65005A 003
xiv	DB-30291-NOPSA-404	PTTEP Document Submission - Regulatory Approvals#3
xv	DB-30291-NOPSA-359	Actual TVD of formation tops for H1 ST1 , H4 and GI ST1

Legend

	Description
C	Annulus Space between 20" conductor and 13 3/8" Csg
B	Annulus Space between 13 3/8" Csg and 9-5/8" Csg
KOP	Kick off point







Note: Texts in BLUE are Expert Witness (EW) calculated values

WAiT© Well Integrity Analysis

"As Built" Well Facts to 9-5/8" (244mm) casing on bottom

<u>12-1/4" hole (9 5/8" Casing) Since considerable difficulties were encountered running casing, The following are extracted from PTTEPAA DDR (EV0000551).</u>

1)Commenced RIH 9 5/8" csg, functioned tested shoe and float OK.

2) Casing Washed down from 2620m MDRT to 3208m MDRT with 1.2m3/min at 2.48Mpa. Running Speed =12 joints/hr.

3) Once washing down commenced, self filling shoe & float lost functionality.

4) Encountered restricted hole at 3208m (KOP +/-) with 22.3t down weight, P/U and over-pull of 26.7t then break over, RIH and attempted to pass 3208m without success, worked string up with string breaking over with 11t over-pull, applied and locked in 1 RH turn while RIH with 1.2m3?min at 3.17 MPa and with increased running speed and passed restricted hole at 3208m continued to RIH from 3208m to 3529m, worked string through restricted hole from 3529m to 3587m by washing down with 1.2m3/min at 2.48MPa and applying and locking in 1/2 RH turns with max 4.7kNm in conjunction with increased running speeds filling each joint. Average speed = 12+ joints/hr. Continued RIH casing while washing down from 3587m to 3676m at 1.2m3/min at 3.44Mpa.

5) RIH casing from 3676m to 3726m and encountered restriction hole at 3726. Unable to go down past 3714m, work string with up 312t down to 80t WIR while circulating at 1.2m3/min at 3.58Mpa and passed 3714m, continued to RIH casing from 3726 to 3754m.

6) Attempted to remove FMS, while attempting to pull hinge pin the handle came away from the pin, held PJSM and pulled FMS 1.5m above R/T, installed rotary bushing and set slips on casing, disengaged CDS and lifted FMS over the top of the casing coupling. Note: Continue to circulate at 1.2m3/min 3.58MPa at all times possible.

7) P/U MLS assembly, B/O running tool and inspected 'O' rings-OK. M/U and applied 2.7Knm LH torque. P/U and RIH with landing string from 3754m to 3779m and observed hung up at 17m below RK=surface well head/wear bushing made serveral attempts to pass without success. POH to inspect MLS from 3779m to 3775m. Disengaged the CDS and P/U on TDS to engage single joint elevators, while doing so the single joint elevators took string weight on coupling below 1.8m X/O pup joint and parted 2x4.75t shackles connecting the single joint elevators to the CDS bail arms.

8) TOFS. Retracted block and lowered to the drill floor, performed inspection of equipment - Ok. Changed out lifting equipment and single joint elevators for back out set, P/U TDS and re-engaged CDS into casing string and continued to circulate with 1.2m3/min while investigation continued.

9) L/D combined landing string joints (1x11.43m joint and 1 x 1.8m pup joint) POH MLS to surface and observed wear bushing wedged on same with MLS latch assembly damaged, cut wear bushing free and L/D 1 x landing joint and MLS assembly consisting of 1 x pup joint above and below. Concurrently deck crew assembled back up MLS assembly.

10) Landed 9 5/8" casing at 3786.1m MDRT(2654 TVDRT). Landed MLS at 28.8m MDRT.

11) Attempted to released CDS from casing string without success. **Sheeve block parted due to incorrect rating.**

12) Backed out landing string from MLS and pulled first 244mm casing pup joint to surface, B/O pup from landing string leave attached to CDS. M/U spare pup joint with power tong and RIH with landing string on single joint elevators, re-engage MLS.

Well Integrity Condition

<u>Primary</u> Well Barrier(s) with respect to Actual Montara Cycle IV Formation as per SECTION 5.8.3, NORSOK D-010 STANDARD, REV 3, AUGUST 2004

Element	Assessment	Traffic Light
1) Hydrostatic column	Drilling fluid (1.20sg) hydrostatic column exhibits 514 to 587psi overbalance to reservoir pressure ASSUMING a range of 1.04sg to 1.06sg at Top Cycle IV reservoir.	Green

<u>Secondary</u> Well Barrier(s) with respect to Actual Montara Cycle IV Formation as per SECTION 5.8.3, NORSOK D-010 STANDARD, REV 3, AUGUST 2004

Element	Assessment	Traffic Light
1) 13-3/8" x 20" TOC	TOC between 13-3/8" x 20" (C Annulus) had not been verified by logs or post cement job calculations. Should permeable zones exist within the unsealed "C" annulus (open shoe), and subsequent reduction of drilling fluid hydrostatic contained in the annuli, due to barite drop out occurring in the forseeable future, potential phenomena of Sustained Casing Pressure (SCP) cannot be ruled out.	Amber
2) 13-3/8" Casing	Pressure tested to 3,000psi (20,684 kPa) for 15 min. Verified Barrier.	Green
3) 9-5/8" Casing	A Pressure test had not been carried out at this stage. Therefore it cannot be verified as a barrier.	Amber
4) BOP	BOP had been tested to 500psi (3.45 MPa) x 5 min (LOW) and 4000psi (27.58MPa) 10min (HIGH) on 19 February 2009. Next Test date 12 March 2009.MSIWHP (Max Shut In Wellhead Pressure), Ref: EV0000073 = 3500 psi.	Green
6) Float valves (BPV)	Unverified BPV in the float collar and float shoe.	Amber

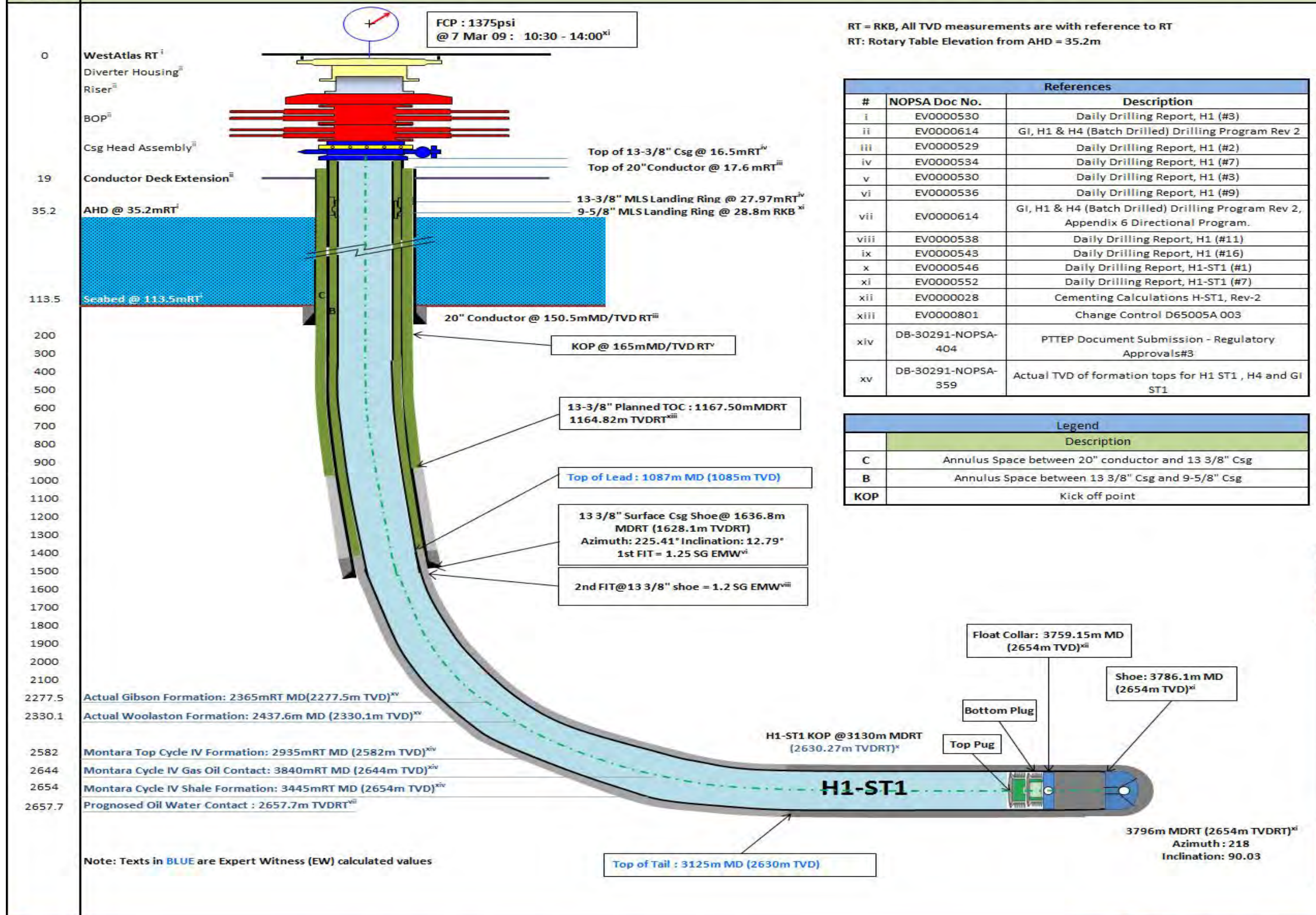
Note: Since the self-filling mechanism keeping the float collar and float shoe valves effectively open, failed, during the trip, it is not known with certainty at this point that the BPV (back pressure valves) in the float shoe and collar are 100% functional. If the self-filling mechanism had worked during running the casing to TD, normal practice would be to de-activate (usually dropping a ball and/or pressurising the casing), the self-fill mechanism and convert the collar and shoe valves to BPV. No such de-activation was deployed.

3.1.5 WI Status of H1-ST1 well at 9-5/8" casing plug bump with FCP 1375 psi

SW ISO Doc Number:	XLS-30291-NOPSA-001
Prepared By:	[illegible]
Reviewed By:	Colin Stuart
Date:	16-Feb-12
Revision Number:	1

INVESTIGATION INTO THE UNCONTROLLED RELEASE OF HYDROCARBONS FROM THE MONTARA WELLHEAD PLATFORM ON THE 21 AUGUST 2009
EXPERT WITNESS REPORT
WAiT© #1- Well Integrity Status of H1/H1-ST1 from TD 12 ¼" to Stage 2 Suspension

TVDRT (m) | **WI Status of H1-ST1 well at 9-5/8" casing plug bump with FCP 1375 psi (Panel 5 of 13)** | **7-Mar-09**



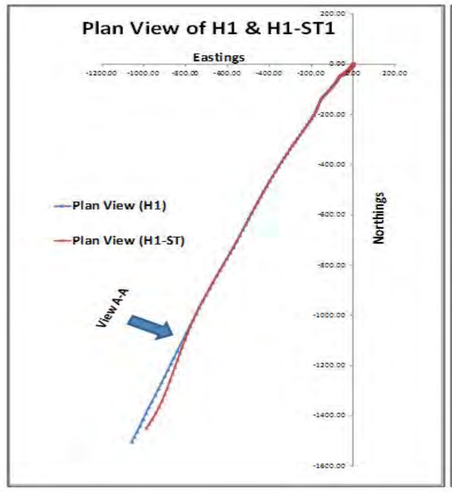
RT = RKB, All TVD measurements are with reference to RT
RT: Rotary Table Elevation from AHD = 35.2m

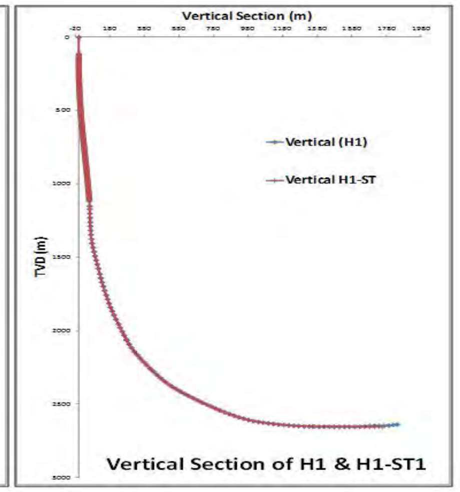
References

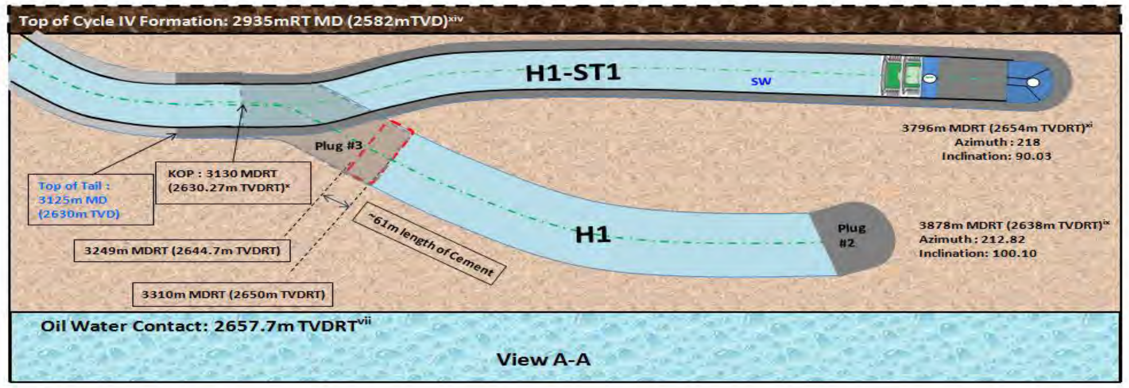
#	NOPSA Doc No.	Description
i	EV0000530	Daily Drilling Report, H1 (#3)
ii	EV0000614	GI, H1 & H4 (Batch Drilled) Drilling Program Rev 2
iii	EV0000529	Daily Drilling Report, H1 (#2)
iv	EV0000534	Daily Drilling Report, H1 (#7)
v	EV0000530	Daily Drilling Report, H1 (#3)
vi	EV0000536	Daily Drilling Report, H1 (#9)
vii	EV0000614	GI, H1 & H4 (Batch Drilled) Drilling Program Rev 2, Appendix 6 Directional Program.
viii	EV0000538	Daily Drilling Report, H1 (#11)
ix	EV0000543	Daily Drilling Report, H1 (#16)
x	EV0000546	Daily Drilling Report, H1-ST1 (#1)
xi	EV0000552	Daily Drilling Report, H1-ST1 (#7)
xii	EV0000028	Cementing Calculations H-ST1, Rev-2
xiii	EV0000801	Change Control D65005A 003
xiv	DB-30291-NOPSA-404	PTTEP Document Submission - Regulatory Approvals#3
xv	DB-30291-NOPSA-359	Actual TVD of formation tops for H1 ST1 , H4 and GI ST1

Legend

	Description
C	Annulus Space between 20" conductor and 13 3/8" Csg
B	Annulus Space between 13 3/8" Csg and 9-5/8" Csg
KOP	Kick off point







WAiT© Well Integrity Analysis

"As Built" Well Facts to 9-5/8" Casing Plug Bump

12-1/4" hole (9 5/8" Casing)

Extract from NOPSA Assumed facts verified by Expert Witness review of all documents:

43. PTTEP then instructed their cementing contractor, Halliburton, to cement the casing in place, as per the approved cementing programme. The Halliburton cementing contractor pumped the approved programmed quantity and quality of cement into the 9 5/8 inch casing and then handed the H1-ST1 Well over to the West Atlas driller.

44. Using the West Atlas drilling pumps the driller pumped the approved programmed volume of inhibited seawater into the well to displace the cement to the bottom of the well. This placed cement in the annulus formed by the 9 5/8 inch casing and the 12 ¼ in hole.

45. A rubber plug known as the 'top plug, was previously installed in the 9 5/8 inch casing between the cement and inhibited seawater. On pumping the agreed volume of seawater the top plug reached the bottom of the casing and sealed against a float collar positioned two casing joints (approximately 20 metes) above the casing shoe.

46. This event, known as "bumping the plug", is an indication that the cement displacement has been carried out in accordance with the cementing programme. This procedure ensures that in addition to cement around the casing in the annulus between the 9 5/8 inch casing and the 12 ¼ hole, an amount of cement is left in the bottom two joints of the casing, known as the 'shoe track'. When the cement has set it should form a barrier to the flow of hydrocarbons, both into the casing and up the annulus.

47. After the plug had been successfully "bumped" the West Atlas driller handed the well back to the Halliburton cementing contractor. He then used the cementing pump to pressurise the casing internally to 4,000 psi for 10 minutes. This required 9.5 barrels of inhibited seawater to be pumped into the casing.

Well Integrity Condition

Primary Well Barrier(s) with respect to Actual Montara Cycle IV Formation as per SECTION 5.8.3, NORSOK D-010 STANDARD, REV 3, AUGUST 2004

Element	Assessment	Traffic Light
1) Hydrostatic column inside casing	0 to 73 psi underbalance to the Montara Cycle IV reservoir pressure ASSUMING a range of 1.04SG to 1.06 SG at top of Montara Cycle IV reservoir. This fluid column will not be considered as a competent well barrier according to Table 15.1 of the Norsok D-010 Standard that states: "The hydrostatic pressure shall at all times be equal to the estimated or measured pore/reservoir pressure, plus a defined safety margin".	
2) Hydrostatic column inside annulus	Annulus hydrostatic barrier: Combined Hydrostatic pressure of cement slurry, spacer, and mud (5042 psi) which exhibits 1046 psi- 1121 psi overbalance to reservoir ASSUMING 1.04 - 1.06 sg at Top of Cycle IV Reservoir.	

Secondary Well Barrier(s) to Actual Montara Cycle IV Formation as per SECTION 5.8.3, NORSOK D-010 STANDARD, REV 3, AUGUST 2004

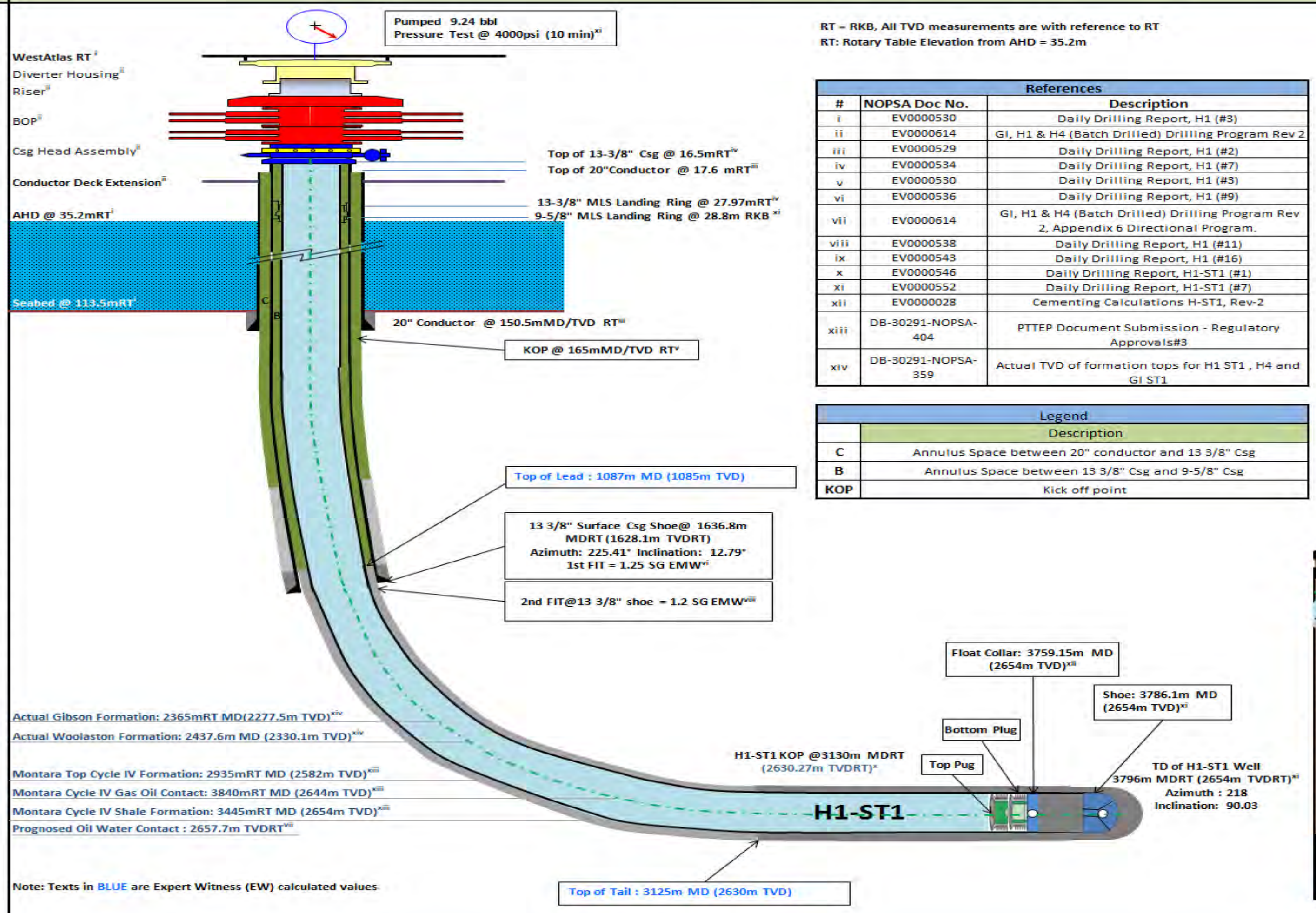
Element	Assessment	Traffic Light
1) 13-3/8" x 20" TOC	TOC between 13-3/8" x 20" (C Annulus) had not been verified by logs or post cement job calculations. Should permeable zones exist within the unsealed "C" annulus (open shoe), and subsequent reduction of drilling fluid hydrostatic contained in the annuli, due to barite drop out occurring in the forseeable future, potential phenomena of Sustained Casing Pressure (SCP) cannot be ruled out.	
2) 13-3/8" Casing	Pressure tested to 3,000psi (20,684 kPa) for 15 min. Verified Barrier.	
3) 9-5/8" Casing	A Pressure test had not been carried out at this stage. Therefore it cannot be verified as a barrier.	
4) BOP	BOP had been tested to 500psi (3.45 MPa) x 5 min (LOW) and 4000psi (27.58MPa) 10min (HIGH) on 19 February 2009. Next Test date 12 March 2009. MSIWHP (Max Shut In Wellhead Pressure), Ref: EV0000073 = 3500 psi.	
5) Float valves (BPV)	Unverified BPV in the float collar and float shoe.	

3.1.6 WI Status of H1-ST1 well during 9-5/8" casing Pressure Test

SW ISO Doc Number:	XLS-30291-NOPSA-001
Prepared By:	[illegible]
Reviewed By:	Colin Stuart
Date:	16-Feb-12
Revision Number:	1

INVESTIGATION INTO THE UNCONTROLLED RELEASE OF HYDROCARBONS FROM THE MONTARA WELLHEAD PLATFORM ON THE 21 AUGUST 2009
EXPERT WITNESS REPORT
WAiT© #1- Well Integrity Status of H1/H1-ST1 from TD 12 ¼" to Stage 2 Suspension

TVDRT (m) | **WI Status of H1-ST1 well during 9-5/8" casing Pressure Test (Panel 6 of 13)** | **7-Mar-09**



RT = RKB, All TVD measurements are with reference to RT
RT: Rotary Table Elevation from AHD = 35.2m

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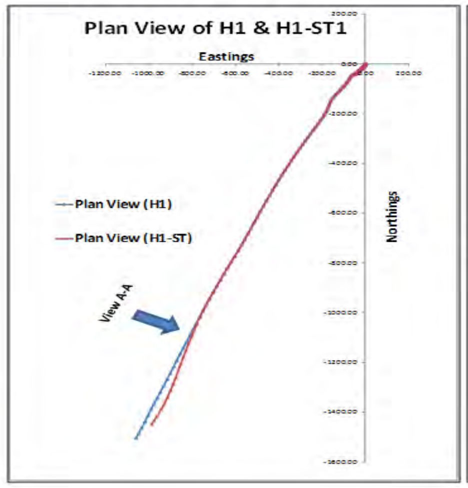
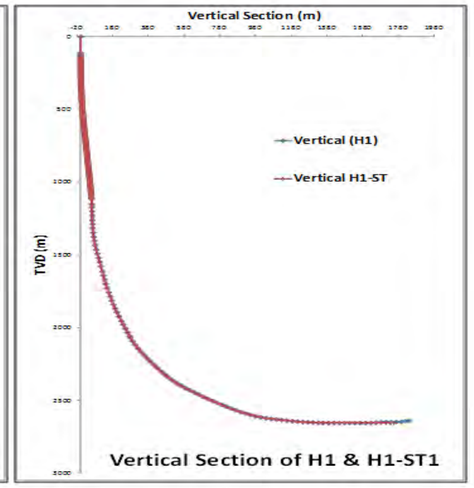
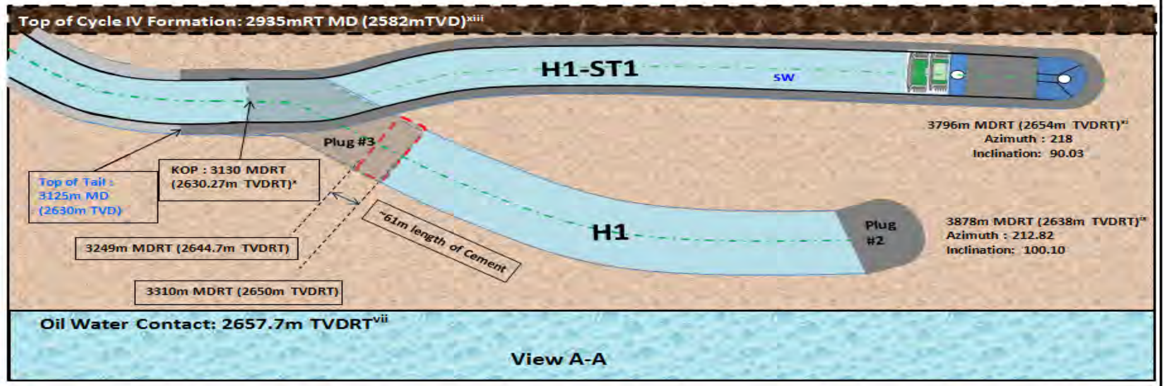
v	EV0000530	Daily Drilling Report, H1 (#3)
vi	EV0000536	Daily Drilling Report, H1 (#9)
vii	EV0000614	GI, H1 & H4 (Batch Drilled) Drilling Program Rev 2, Appendix 6 Directional Program.
viii	EV0000538	Daily Drilling Report, H1 (#11)
ix	EV0000543	Daily Drilling Report, H1 (#16)
x	EV0000546	Daily Drilling Report, H1-ST1 (#1)
xi	EV0000552	Daily Drilling Report, H1-ST1 (#7)
xii	EV0000028	Cementing Calculations H-ST1, Rev-2
xiii	DB-30291-NOPSA-404	PTTEP Document Submission - Regulatory Approvals#3
xiv	DB-30291-NOPSA-359	Actual TVD of formation tops for H1 ST1 , H4 and GI ST1

Legend	
	Description
C	Annulus Space between 20" conductor and 13 3/8" Csg
B	Annulus Space between 13 3/8" Csg and 9-5/8" Csg
KOP	Kick off point







WAiT© Well Integrity Analysis

"As Built" Well Facts to 9-5/8" Casing Pressure Test

12-1/4" hole (9 5/8" Casing)

Extract from NOPSA Assumed facts verified by Expert Witness review of all documents:

47. After the plug had been successfully "bumped" the West Atlas driller handed the well back to the Halliburton cementing contractor. He then used the cementing pump to pressurise the casing internally to 4,000 psi for 10 minutes. This required 9.5 barrels of inhibited seawater to be pumped into the casing.

Well Integrity Condition

Primary Well Barrier(s) with respect to Actual Montara Cycle IV Formation as per SECTION 5.8.3, NORSOK D-010 STANDARD, REV 3, AUGUST 2004

Element	Assessment	Traffic Light
1) Hydrostatic column inside casing	0 to 73 psi underbalance to the Montara Cycle IV reservoir pressure ASSUMING a range of 1.04SG to 1.06 SG at top of Montara Cycle IV reservoir. This fluid column will not be considered as a competent well barrier according to Table 15.1 of the Norsok D-010 Standard that states: "The hydrostatic pressure shall at all times be equal to the estimated or measured pore/reservoir pressure, plus a defined safety margin".	Red
2) Hydrostatic column inside annulus	Annulus hydrostatic barrier: Combined Hydrostatic pressure of cement slurry, spacer, and mud (5042 psi) which exhibits 1046 psi- 1121 psi overbalance to reservoir ASSUMING 1.04 - 1.06 sg at Top of Cycle IV Reservoir.	Green

Secondary Well Barrier(s) to Actual Montara Cycle IV Formation as per SECTION 5.8.3, NORSOK D-010 STANDARD, REV 3, AUGUST 2004

Element	Assessment	Traffic Light
1) 13-3/8" x 20" TOC	TOC between 13-3/8" x 20" (C Annulus) had not been verified by logs or post cement job calculations. Should permeable zones exist within the unsealed "C" annulus (open shoe), and subsequent reduction of drilling fluid hydrostatic contained in the annuli, due to barite drop out occurring in the forseeable future, potential phenomena of Sustained Casing Pressure (SCP) cannot be ruled out.	Amber
2) 13-3/8" Casing	Pressure tested to 3,000psi (20,684 kPa) for 15 min. Good test verifying the 13-3/8" casing as a barrier.	Green
3) 9-5/8" Casing	Pressure tested to 4000psi (2.76MPa) for 10 min, Good Test verifying the 9 5/8" Casing above the shoe track as a barrier.	Green
4) BOP	BOP had been tested to 500psi (3.45 MPa) x 5 min (LOW) and 4000psi (27.58MPa) 10min (HIGH) on 19 February 2009. Next Test date 12 March 2009. MSIWHP (Max Shut In Wellhead Pressure), Ref: EV0000073 = 3500 psi.	Green
5) Float valves (BPV)	Unverified BPV in the float collar and float shoe.	Amber

3.1.7 WI Status of H1-ST1 well after 9-5/8" casing Pressure test and bleed off

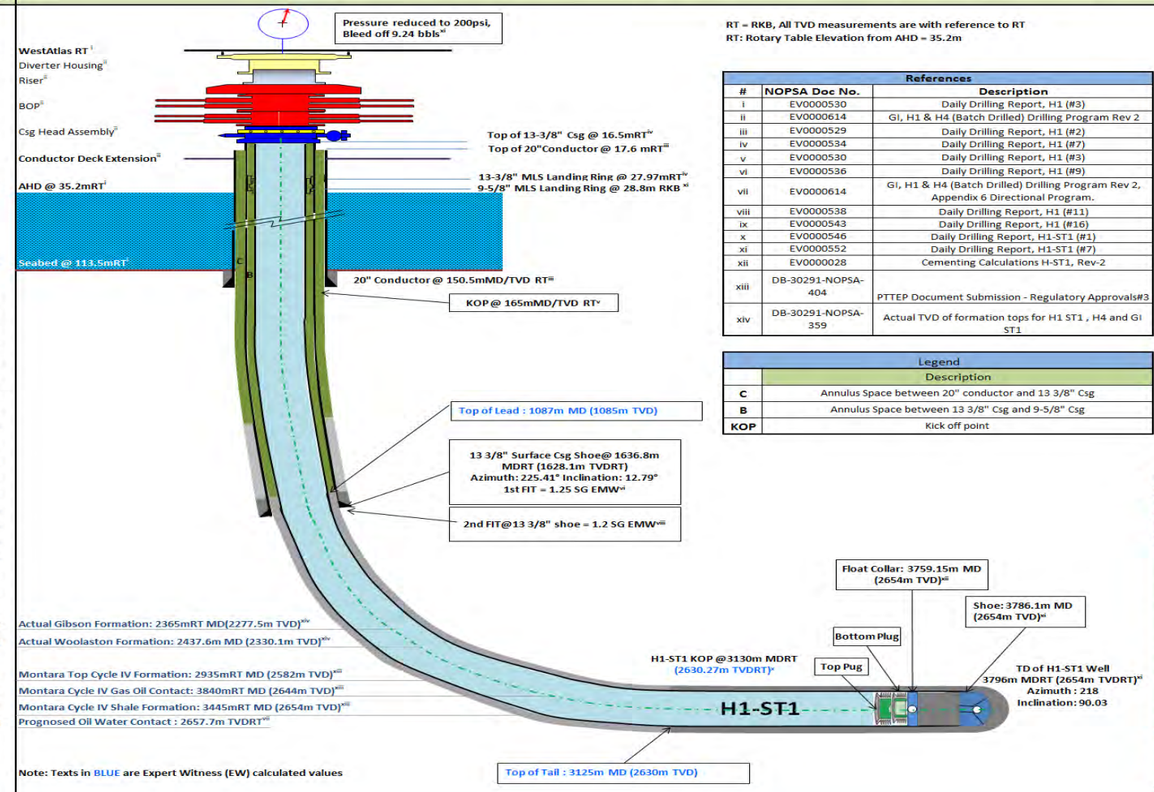
SW ISO Doc Number:	XLS-30291-NOPSA-001
Prepared By:	Myo Kyaw Thu/ Liaw Liaf Yeau Foof Yen Min.
Reviewed By:	Colin Stuart
Date:	16-Feb-12
Revision Number:	1

INVESTIGATION INTO THE UNCONTROLLED RELEASE OF HYDROCARBONS FROM THE MONTARA WELLHEAD PLATFORM ON THE 21 AUGUST 2009

EXPERT WITNESS REPORT

WAiT© #1- Well Integrity Status of H1/H1-ST1 from TD 12 ¼" to Stage 2 Suspension

TVDRT (m) | **WI Status of H1-ST1 well after 9-5/8" casing Pressure test and bleed off (Panel 7 of 13)** | **7-Mar-09**



RT = RKB, All TVD measurements are with reference to RT
RT: Rotary Table Elevation from AHD = 35.2m

References		
#	NOPSA Doc No.	Description
i	EV0000530	Daily Drilling Report, H1 (#3)
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iii	EV0000529	Daily Drilling Report, H1 (#2)
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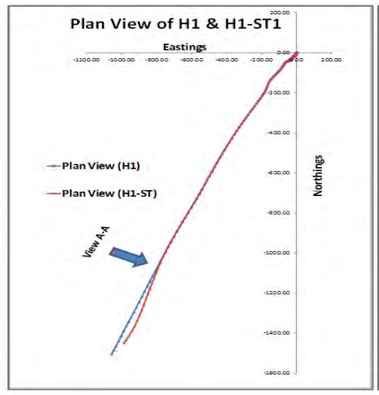
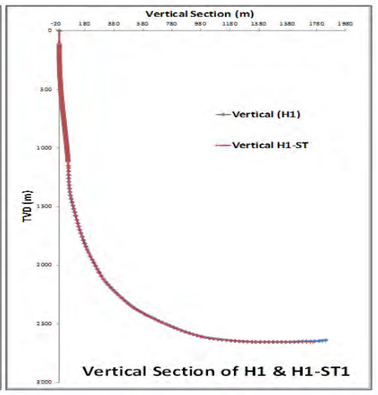
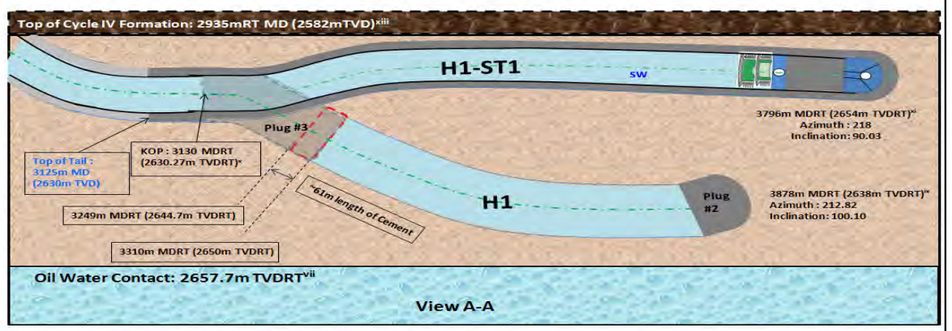
vi	EV0000536	Daily Drilling Report, H1 (#9)
vii	EV0000614	GI, H1 & H4 (Batch Drilled) Drilling Program Rev 2, Appendix 6 Directional Program.
viii	EV0000538	Daily Drilling Report, H1 (#11)
ix	EV0000543	Daily Drilling Report, H1 (#16)
x	EV0000546	Daily Drilling Report, H1-ST1 (#1)
xi	EV0000552	Daily Drilling Report, H1-ST1 (#7)
xii	EV0000028	Cementing Calculations H-ST1, Rev-2
xiii	DB-30291-NOPSA-404	PTTEP Document Submission - Regulatory Approvals#3
xiv	DB-30291-NOPSA-359	Actual TVD of formation tops for H1 ST1 , H4 and GI ST1

Legend	
	Description
C	Annulus Space between 20" conductor and 13 3/8" Csg
B	Annulus Space between 13 3/8" Csg and 9-5/8" Csg
KOP	Kick off point







WAIT© Well Integrity Analysis

"As Built" Well Facts to 9-5/8" Casing Pressure Test and bleed off

12-1/4" hole (9 5/8" Casing)

Extract from NOPSA Assumed facts verified by Expert Witness review of all documents:

48. On completion of the pressure test, the Halliburton cementing contractor, under instruction from PTTEPAA, bled off the pressure in the casing by opening a valve on the cementing unit. As expected this allowed the 9.5 barrels of inhibited seawater used to pressurise the casing to back-flow into the tanks on the cement unit.

Well Integrity Condition

Primary Well Barrier(s) with respect to Actual Montara Cycle IV Formation as per SECTION 5.8.3, NORSOK D-010 STANDARD, REV 3, AUGUST 2004

Element	Assessment	Traffic Light
1) Hydrostatic column inside casing	0 to 73 psi underbalance to the Montara Cycle IV reservoir pressure ASSUMING a range of 1.04SG to 1.06 SG at top of Montara Cycle IV reservoir. This fluid column will not be considered as a competent well barrier according to Table 15.1 of the Norsok D-010 Standard that states: "The hydrostatic pressure shall at all times be equal to the estimated or measured pore/reservoir pressure, plus a defined safety margin".	
2) Hydrostatic column inside annulus	Annulus hydrostatic barrier: Hydrostatic pressure due to cement slurry, spacer, and mud (hydrostatic = 5042 psi) which exhibits 1046 psi- 1121 psi overbalance to reservoir ASSUMING 1.04 - 1.06 sg at Top of Cycle IV Reservoir.	

Secondary Well Barrier(s) to Actual Montara Cycle IV Formation as per SECTION 5.8.3, NORSOK D-010 STANDARD, REV 3, AUGUST 2004

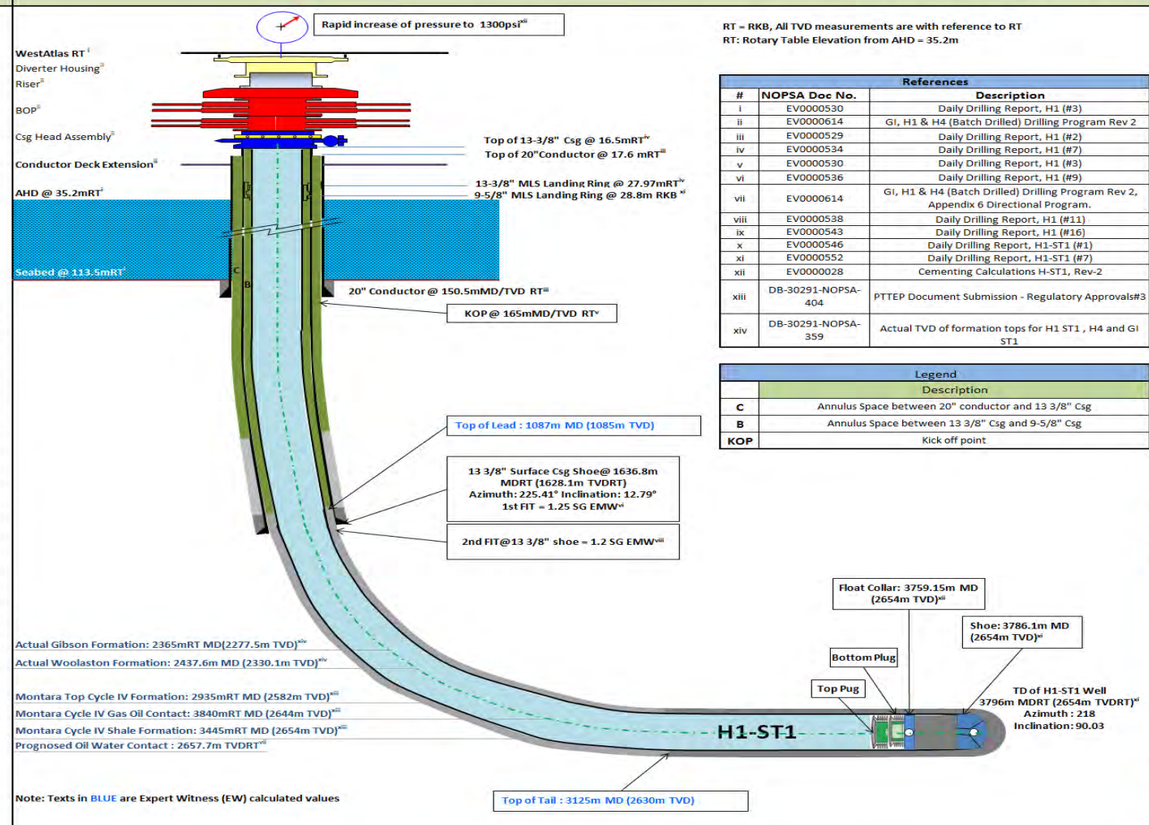
Element	Assessment	Traffic Light
1) 13-3/8" x 20" TOC	TOC between 13-3/8" x 20" (C Annulus) had not been verified by logs or post cement job calculations. Should permeable zones exist within the unsealed "C" annulus (open shoe), and subsequent reduction of drilling fluid hydrostatic contained in the annuli, due to barite drop out occurring in the forseeable future, potential phenomena of Sustained Casing Pressure (SCP) cannot be ruled out.	
2) 13-3/8" Casing	Pressure tested to 3,000psi (20,684 kPa) for 15 min. Good test verifying the 13-3/8" casing as a barrier.	
3) 9-5/8" Casing	Pressure tested to 4000psi (2.76MPa) for 10 min, Good Test verifying the 9 5/8" Casing above the shoe track as a barrier.	
4) BOP	BOP had been tested to 500psi (3.45 MPa) x 5 min (LOW) and 4000psi (27.58MPa) 10min (HIGH) on 19 February 2009. Next Test date 12 March 2009. MSIWHP (Max Shut In Wellhead Pressure), Ref: EV0000073 = 3500 psi.	
5) Float valves (BPV)	Unverified BPV in the float collar and float shoe.	

3.1.8 WI Status of H1-ST1 well at 9-5/8" Casing Float Failure

SW ISO Doc Number:	XLS-30291-NOPSA-001
Prepared By:	Myo Kyaw Thet Linn Lim Sean Foo Yan Min
Reviewed By:	Colin Stuart
Date:	16-Feb-12
Revision Number:	1

INVESTIGATION INTO THE UNCONTROLLED RELEASE OF HYDROCARBONS FROM THE MONTARA WELLHEAD PLATFORM ON THE 21 AUGUST 2009
EXPERT WITNESS REPORT
WAiT© #1- Well Integrity Status of H1/H1-ST1 from TD 12 ¼" to Stage 2 Suspension

TVDRT (m) | **WI Status of H1-ST1 well at 9-5/8" Casing Float Failure (Panel 8 of 13)** | **7-Mar-09**

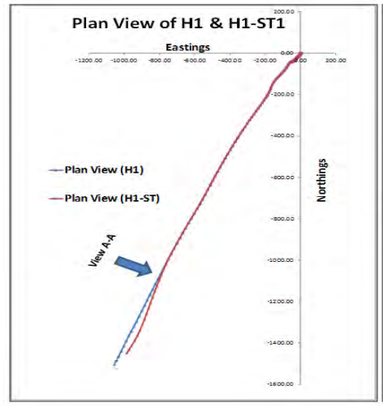


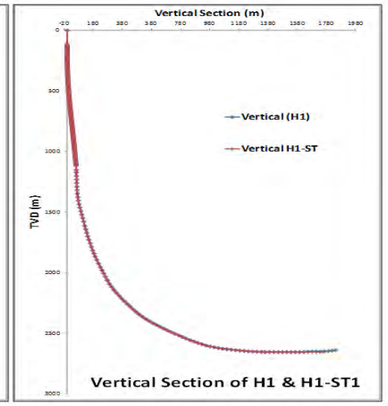
Note: Texts in BLUE are Expert Witness (EW) calculated values

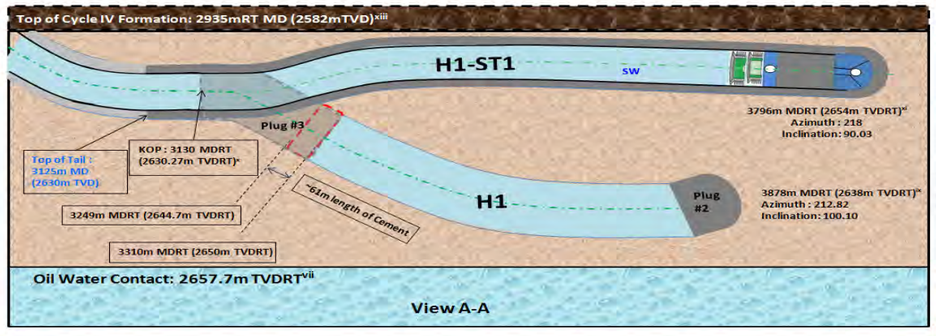
RT = RKB, All TVD measurements are with reference to RT
RT: Rotary Table Elevation from AHD = 35.2m

References		
#	NOPSA Doc No.	Description
i	EV0000530	Daily Drilling Report, H1 (#3)
ii	EV0000614	GI, H1 & H4 (Batch Drilled) Drilling Program Rev 2
iii	EV0000529	Daily Drilling Report, H1 (#2)
iv	EV0000534	Daily Drilling Report, H1 (#7)
v	EV0000530	Daily Drilling Report, H1 (#3)
vi	EV0000536	Daily Drilling Report, H1 (#9)
vii	EV0000614	GI, H1 & H4 (Batch Drilled) Drilling Program Rev 2, Appendix 6 Directional Program.
viii	EV0000538	Daily Drilling Report, H1 (#11)
ix	EV0000543	Daily Drilling Report, H1 (#16)
x	EV0000546	Daily Drilling Report, H1-ST1 (#1)
xi	EV0000552	Daily Drilling Report, H1-ST1 (#7)
xii	EV0000028	Cementing Calculations H-ST1, Rev-2
xiii	DB-30291-NOPSA-404	PTTEP Document Submission - Regulatory Approvals#3
xiv	DB-30291-NOPSA-359	Actual TVD of formation tops for H1 ST1 , H4 and GI ST1

Legend	
	Description
C	Annulus Space between 20" conductor and 13 3/8" Csg
B	Annulus Space between 13 3/8" Csg and 9-5/8" Csg
KOP	Kick off point







WAiT© Well Integrity Analysis

"As Built" Well Facts at 9-5/8" Casing Float Failure

12-1/4" hole (9 5/8" Casing)

Extract from NOPSA Assumed facts verified by Expert Witness review of all documents:

49. The pressure in the casing then fell to approximately 200 psi and the 9.5 barrels of inhibited seawater had back flowed into the cementing unit tanks. Then there was a sudden and unexpected increase in pressure and an additional 7 barrels of inhibited seawater flowed out of the casing before the Halliburton contractor was able to close the valve.

Well Integrity Condition

Primary Well Barrier(s) with respect to Actual Montara Cycle IV Formation as per SECTION 5.8.3, NORSOK D-010 STANDARD, REV 3, AUGUST 2004

Element	Assessment	Traffic Light
1) Hydrostatic column inside casing	0 to 73 psi underbalance to the Montara Cycle IV reservoir pressure ASSUMING a range of 1.04SG to 1.06 SG at top of Montara Cycle IV reservoir. This fluid column will not be considered as a competent well barrier according to Table 15.1 of the Norsok D-010 Standard that states: "The hydrostatic pressure shall at all times be equal to the estimated or measured pore/reservoir pressure, plus a defined safety margin".	
2) Hydrostatic column inside annulus	Annulus hydrostatic barrier: Hydrostatic pressure due to cement slurry, spacer, and mud (hydrostatic = 5042 psi) which exhibits 1046 psi- 1121 psi overbalance to reservoir ASSUMING 1.04 - 1.06 sg at Top of Cycle IV Reservoir.	

Secondary Well Barrier(s) to Actual Montara Cycle IV Formation as per SECTION 5.8.3, NORSOK D-010 STANDARD, REV 3, AUGUST 2004

Element	Assessment	Traffic Light
1) 13-3/8" x 20" TOC	TOC between 13-3/8" x 20" (C Annulus) had not been verified by logs or post cement job calculations. Should permeable zones exist within the unsealed "C" annulus (open shoe), and subsequent reduction of drilling fluid hydrostatic contained in the annuli, due to barite drop out occurring in the forseeable future, potential phenomena of Sustained Casing Pressure (SCP) cannot be ruled out.	
2) 13-3/8" Casing	Pressure tested to 3,000psi (20,684 kPa) for 15 min. Good test verifying the 13-3/8" casing as a barrier.	
3) 9-5/8" Casing	Pressure tested to 4000psi (2.76MPa) for 10 min, Good Test verifying the 9 5/8" Casing above the shoe track as a barrier.	
4) BOP	BOP had been tested to 500psi (3.45 MPa) x 5 min (LOW) and 4000psi (27.58MPa) 10min (HIGH) on 19 February 2009. Next Test date 12 March 2009. MSIWHP (Max Shut In Wellhead Pressure), Ref: EV0000073 = 3500 psi.	
5) Float valves (BPV)	Floats failed to hold the back pressure. Overdisplaced cement compromised shoe track (wet shoe). Incompetent barrier.	

3.1.9 WI Status of H1-ST1 well at 9-5/8" Casing Float Failure and Backflow

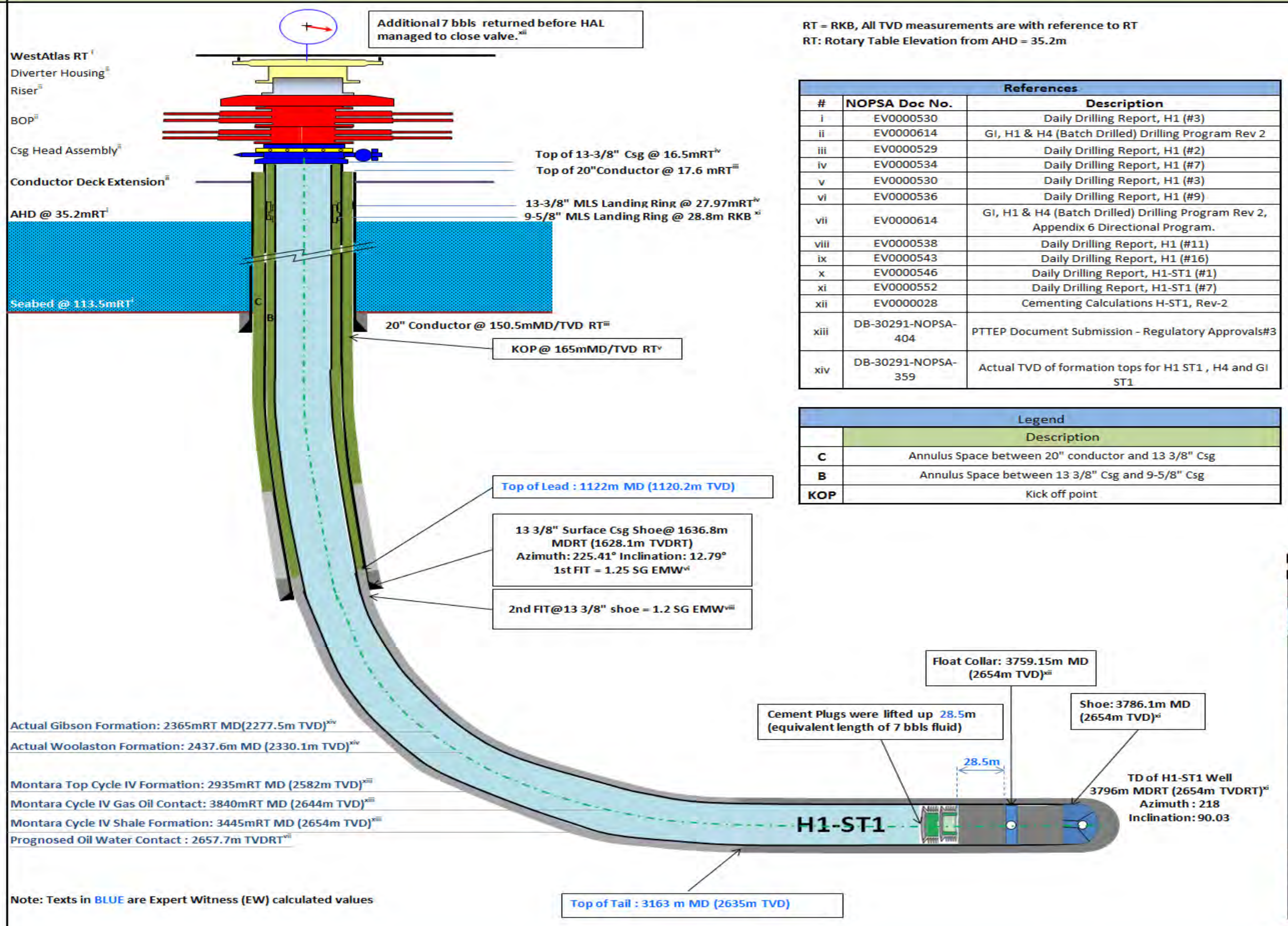
SW ISO Doc Number:	XLS-30291-NOPSA-001
Prepared By:	Myo Kyaw Thet/ Lines Lim/ Sean Foo/ Yeo Min
Reviewed By:	Colin Stuart
Date:	16-Feb-12
Revision Number:	1

INVESTIGATION INTO THE UNCONTROLLED RELEASE OF HYDROCARBONS FROM THE MONTARA WELLHEAD PLATFORM ON THE 21 AUGUST 2009

EXPERT WITNESS REPORT

WAiT© #1- Well Integrity Status of H1/H1-ST1 from TD 12 ¼" to Stage 2 Suspension

TVDRT (m) — **WI Status of H1-ST1 well at 9-5/8" Casing Float Failure and Backflow (Panel 9 of 13)** — **7-Mar-09**



RT = RKB, All TVD measurements are with reference to RT
RT: Rotary Table Elevation from AHD = 35.2m

References		
#	NOPSA Doc No.	Description
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ii	EV0000614	GI, H1 & H4 (Batch Drilled) Drilling Program Rev 2
iii	EV0000529	Daily Drilling Report, H1 (#2)
iv	EV0000534	Daily Drilling Report, H1 (#7)
v	EV0000530	Daily Drilling Report, H1 (#3)
vi	EV0000536	Daily Drilling Report, H1 (#9)
vii	EV0000614	GI, H1 & H4 (Batch Drilled) Drilling Program Rev 2, Appendix 6 Directional Program.
viii	EV0000538	Daily Drilling Report, H1 (#11)
ix	EV0000543	Daily Drilling Report, H1 (#16)
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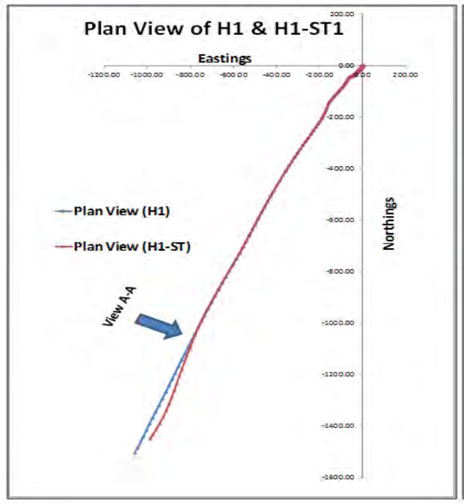
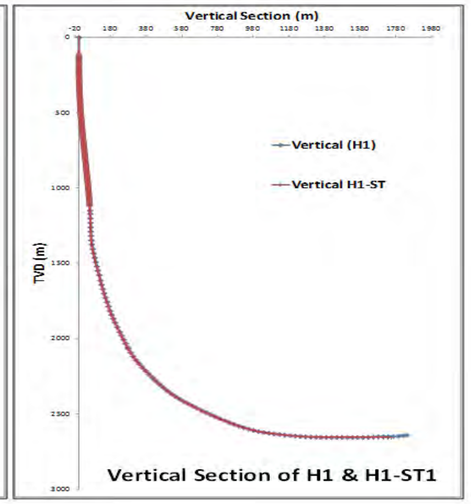
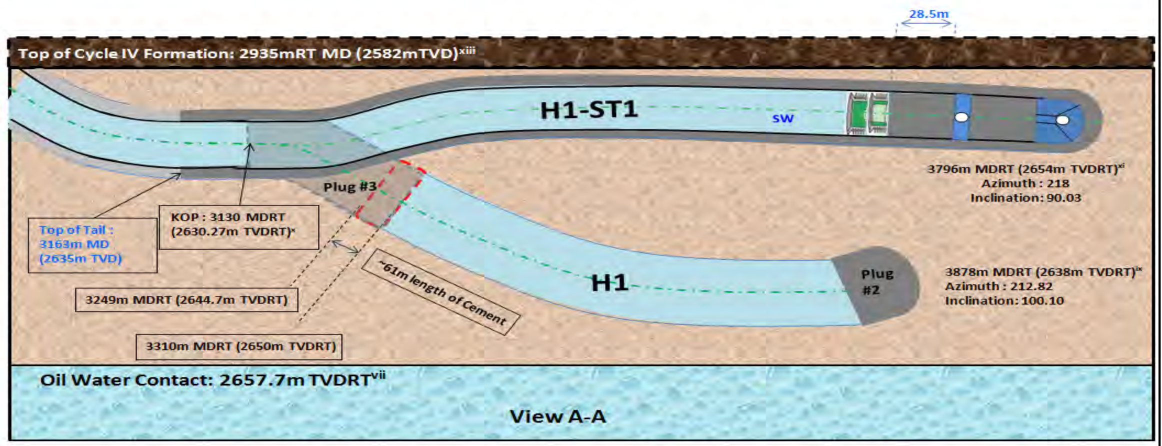
xi	EV0000552	Daily Drilling Report, H1-ST1 (#7)
xii	EV0000028	Cementing Calculations H-ST1, Rev-2
xiii	DB-30291-NOPSA-404	PTTEP Document Submission - Regulatory Approvals#3
xiv	DB-30291-NOPSA-359	Actual TVD of formation tops for H1 ST1 , H4 and GI ST1

Legend	
	Description
C	Annulus Space between 20" conductor and 13 3/8" Csg
B	Annulus Space between 13 3/8" Csg and 9-5/8" Csg
KOP	Kick off point







WAiT© Well Integrity Analysis

"As Built" Well Facts at 9-5/8" at Casing Float Failure and Cement Plug Liftup

12-1/4" hole (9 5/8" Casing)

Extract from NOPSA Assumed facts verified by Expert Witness review of all documents:

50. The additional 7 barrels expelled at the surface was due to an equivalent volume of fluids entering the bottom of the casing. The PTTEPAA Day Drilling Supervisor reported in the PTTEPAA daily drilling report for the 7 March 2009, the influx and the failure of the two non-return valves in the float collar.

Well Integrity Condition

Primary Well Barrier(s) with respect to Actual Montara Cycle IV Formation as per SECTION 5.8.3, NORSOK D-010 STANDARD, REV 3, AUGUST 2004

Element	Assessment	Traffic Light
1) Hydrostatic column inside casing	0 to 73 psi underbalance to the Montara Cycle IV reservoir pressure ASSUMING a range of 1.04SG to 1.06 SG at top of Montara Cycle IV reservoir. This fluid column will not be considered as a competent well barrier according to Table 15.1 of the Norsok D-010 Standard that states: "The hydrostatic pressure shall at all times be equal to the estimated or measured pore/reservoir pressure, plus a defined safety margin".	Red
2) Hydrostatic column inside annulus	Annulus hydrostatic barrier: Hydrostatic pressure due to cement slurry, spacer, and mud (hydrostatic = 5042 psi) which exhibits 1046 psi- 1121 psi overbalance to reservoir ASSUMING 1.04 - 1.06 sg at Top of Cycle IV Reservoir.	Green

Secondary Well Barrier(s) to Actual Montara Cycle IV Formation as per SECTION 5.8.3, NORSOK D-010 STANDARD, REV 3, AUGUST 2004

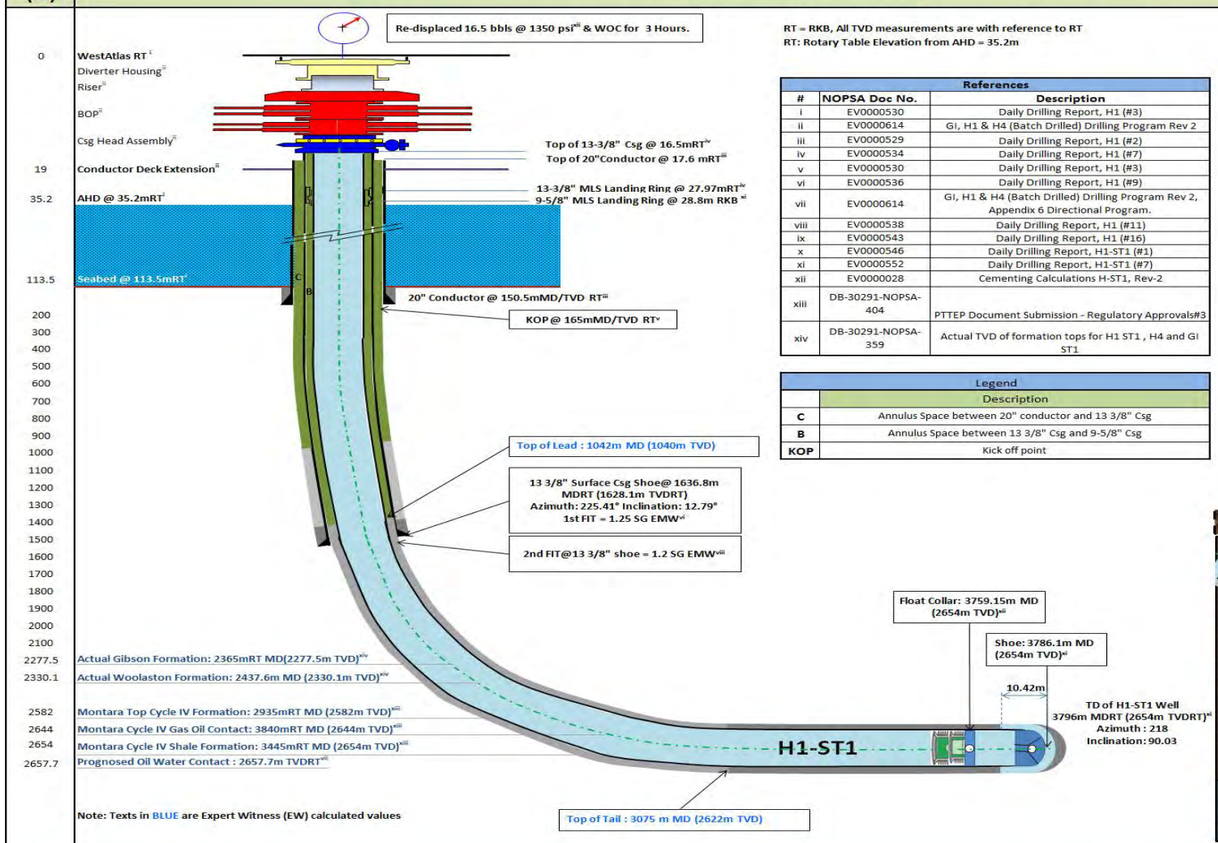
Element	Assessment	Traffic Light
1) 13-3/8" x 20" TOC	TOC between 13-3/8" x 20" (C Annulus) had not been verified by logs or post cement job calculations. Should permeable zones exist within the unsealed "C" annulus (open shoe), and subsequent reduction of drilling fluid hydrostatic contained in the annuli, due to barite drop out occurring in the forseeable future, potential phenomena of Sustained Casing Pressure (SCP) cannot be ruled out.	Amber
2) 13-3/8" Casing	Pressure tested to 3,000psi (20,684 kPa) for 15 min. Good test verifying the 13-3/8" casing as a barrier.	Green
3) 9-5/8" Casing	Pressure tested to 4000psi (2.76MPa) for 10 min, Good Test verifying the 9 5/8" Casing above the shoe track as a barrier.	Green
4) BOP	BOP had been tested to 500psi (3.45 MPa) x 5 min (LOW) and 4000psi (27.58MPa) 10min (HIGH) on 19 February 2009. Next Test date 12 March 2009. MSIWHP (Max Shut In Wellhead Pressure), Ref: EV0000073 = 3500 psi.	Green
5) Float valves (BPV)	Floats failed to hold the back pressure. Overdisplaced cement compromised shoe track (wet shoe). Incompetent barrier.	Red

3.1.10WI Status of H1-ST1 Well, after overdisplacement of 16bbl of SW back into 9-5/8" casing

SW ISO Doc Number:	XLS-30291-NOPSA-001
Prepared By:	Myo Kyaw Thu/ Liaw Lin/ Sean Foo/ Yan Min
Reviewed By:	Colin Stuart
Date:	16-Feb-12
Revision Number:	1

INVESTIGATION INTO THE UNCONTROLLED RELEASE OF HYDROCARBONS FROM THE MONTARA WELLHEAD PLATFORM ON THE 21 AUGUST 2009
EXPERT WITNESS REPORT
WAiT© #1- Well Integrity Status of H1/H1-ST1 from TD 12 ¼" to Stage 2 Suspension

TVDRT (m) | **WI Status of H1-ST1 Well, after overdisplacement of 16bbl of SW back into 9-5/8" casing (Panel 10 of 13)** | **7-Mar-09**



RT = RKB, All TVD measurements are with reference to RT
RT: Rotary Table Elevation from AHD = 35.2m

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iii	EV0000529	Daily Drilling Report, H1 (#2)
iv	EV0000534	Daily Drilling Report, H1 (#7)
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vi	EV0000536	Daily Drilling Report, H1 (#9)
vii	EV0000614	Gi, H1 & H4 (Batch Drilled) Drilling Program Rev 2, Appendix 6 Directional Program.
viii	EV0000538	Daily Drilling Report, H1 (#11)
ix	EV0000543	Daily Drilling Report, H1 (#16)
x	EV0000546	Daily Drilling Report, H1-ST1 (#1)
xi	EV0000552	Daily Drilling Report, H1-ST1 (#7)
xii	EV0000028	Cementing Calculations H-ST1, Rev-2
xiii	DB-30291-NOPSA-404	PTTEP Document Submission - Regulatory Approvals#3
xiv	DB-30291-NOPSA-359	Actual TVD of formation tops for H1 ST1 , H4 and GI ST1

Legend	
	Description
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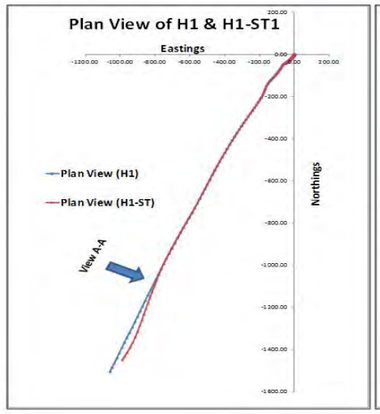
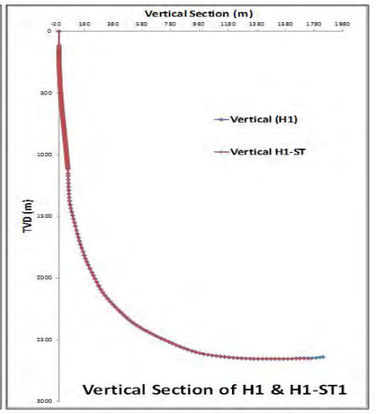
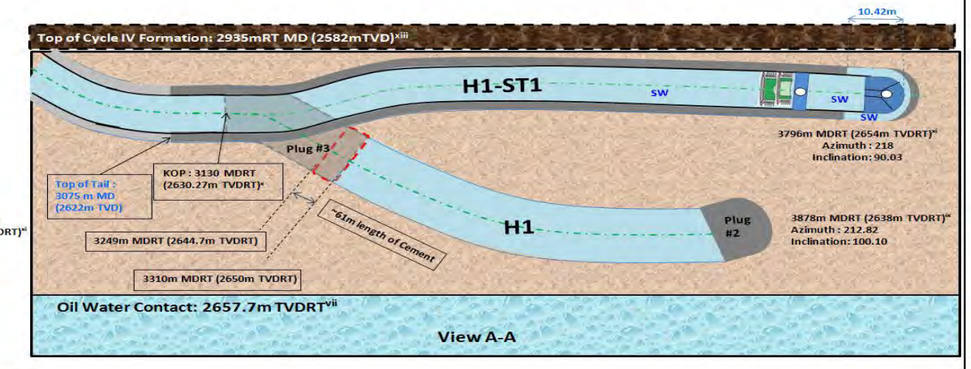
B	Annulus Space between 13 3/8" Csg and 9-5/8" Csg
KOP	Kick off point







WAiT© Well Integrity Analysis

"As Built" Well Facts at Overdisplacement of 16.0bbl of Seawater back into the 9 5/8" casing

12-1/4" hole (9 5/8" Casing)

Extract from NOPSA Assumed facts verified by Expert Witness review of all documents:

51. PTTEPAA then instructed their Halliburton cementing contractor to pump 16.0 barrels of inhibited seawater back into the 9 5/8 inch casing. This displaced an equal volume of fluid from the 9 5/8 inch casing shoe. The 16 barrels were 9 barrels more than entered the casing and had the effect of forcing out some or all of the cement in the shoe track leaving it in a contaminated condition, also known as a wet shoe.

Well Integrity Condition

Primary Well Barrier(s) with respect to Actual Montara Cycle IV Formation as per SECTION 5.8.3, NORSOK D-010 STANDARD, REV 3, AUGUST 2004

Element	Assessment	Traffic Light
1) Hydrostatic column inside Casing	0 to 73 psi underbalance to the Montara Cycle IV reservoir pressure ASSUMING a range of 1.04SG to 1.06 SG at top of Montara Cycle IV reservoir. This fluid column will not be considered as a competent well barrier according to Table 15.1 of the Norsok D-010 Standard that states: "The hydrostatic pressure shall at all times be equal to the estimated or measured pore/reservoir pressure, plus a defined safety margin".	
2) Hydrostatic column inside annulus	Annulus hydrostatic barrier: Hydrostatic pressure due to cement slurry, spacer, and mud (hydrostatic = 5042 psi) which exhibits 1046 psi- 1121 psi overbalance to reservoir ASSUMING 1.04 - 1.06 sg at Top of Cycle IV Reservoir.	

Secondary Well Barrier(s) to Actual Montara Cycle IV Formation as per SECTION 5.8.3, NORSOK D-010 STANDARD, REV 3, AUGUST 2004

Element	Assessment	Traffic Light
1) 13-3/8" x 20" TOC	TOC between 13-3/8" x 20" (C Annulus) had not been verified by logs or post cement job calculations. Should permeable zones exist within the unsealed "C" annulus (open shoe), and subsequent reduction of drilling fluid hydrostatic contained in the annuli, due to barite drop out occurring in the forseeable future, potential phenomena of Sustained Casing Pressure (SCP) cannot be ruled out.	
2) 13-3/8" Casing	Pressure tested to 3,000psi (20,684 kPa) for 15 min. Good test verifying the 13-3/8" casing as a barrier.	
3) 9-5/8 Casing	Pressure tested to 4000psi (2.76MPa) for 10 min, Good Test verifying the 9 5/8" Casing above the shoe track as a barrier.	
4) BOP	BOP had been tested to 500psi (3.45 MPa) x 5 min (LOW) and 4000psi (27.58MPa) 10min (HIGH) on 19 February 2009. Next Test date 12 March 2009	
5) Float and shoe track	Floats failed to hold the back pressure. Overdisplaced cement compromised shoe track (wet shoe). Incompetent barrier.	
6) Abandonment of H1	Estimated 61m length of cement plug (plug #2) and unverified bottom plug (plug #1) in abandoned H1 wellbore.	

3.1.11WI Status of H1-ST1 Well, Post Overdisplacement

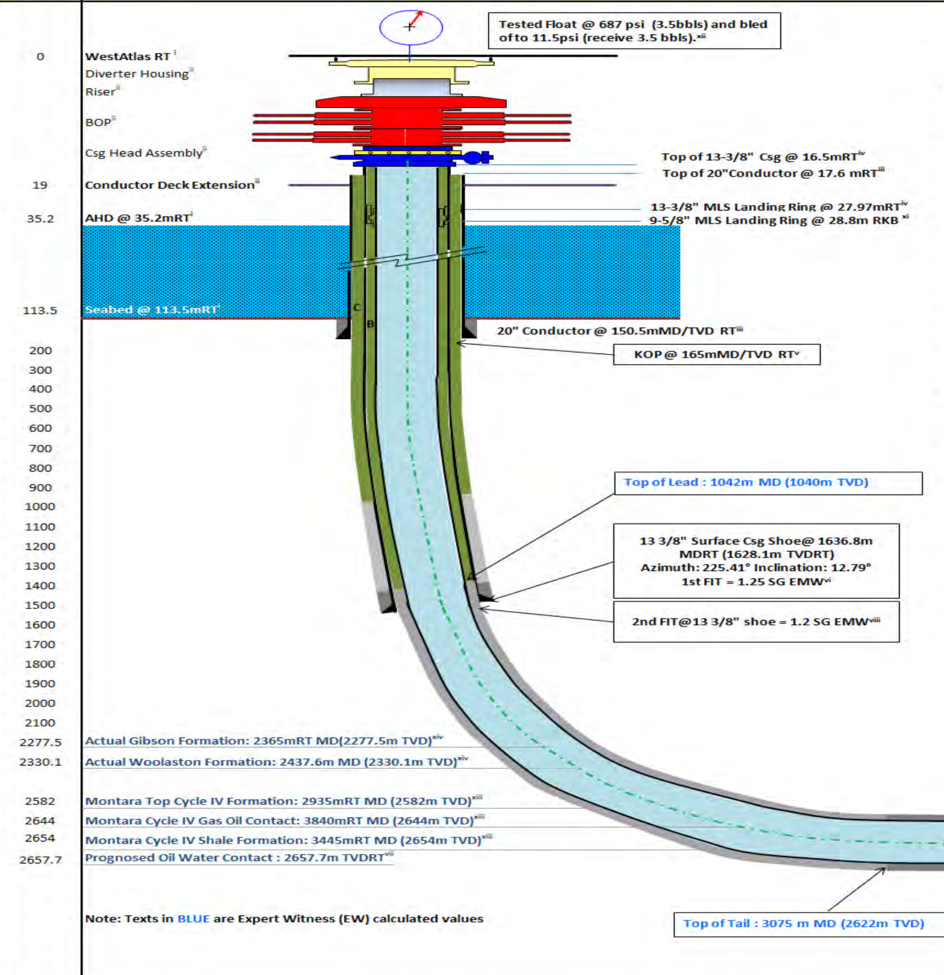
SW ISO Doc Number:	XLS-30291-NOPSA-001
Prepared By:	Myo Kyaw Thu/ Linus Lim/ Sean Foo/ Yeo Min
Reviewed By:	Colin Stuart
Date:	16-Feb-12
Revision Number:	1

INVESTIGATION INTO THE UNCONTROLLED RELEASE OF HYDROCARBONS FROM THE MONTARA WELLHEAD PLATFORM ON THE 21 AUGUST 2009 EXPERT WITNESS REPORT

WAiT© #1- Well Integrity Status of H1/H1-ST1 from TD 12 ¼" to Stage 2 Suspension

WI Status of H1-ST1 Well, Post Overdisplacement (Panel 11 of 13)

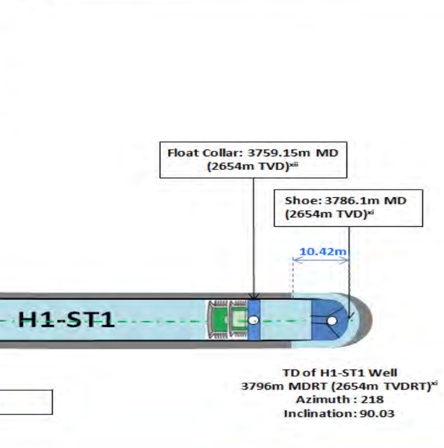
7-Mar-09

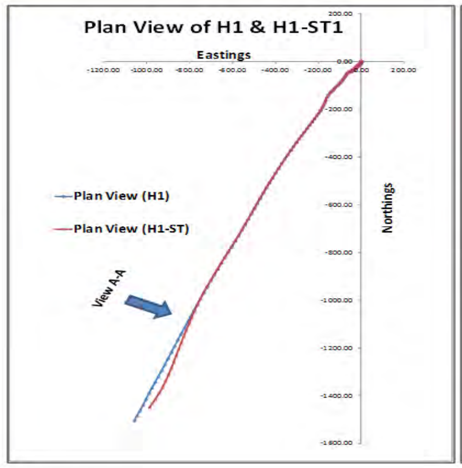


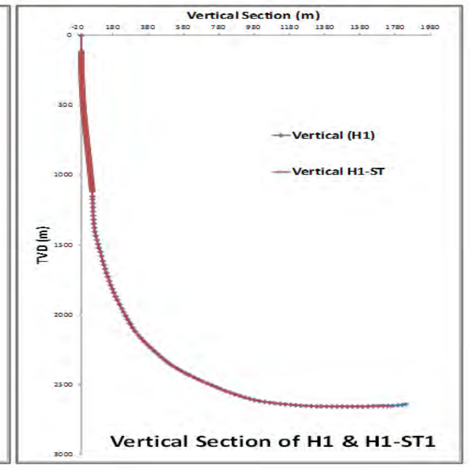
RT = RKB, All TVD measurements are with reference to RT
RT: Rotary Table Elevation from AHD = 35.2m

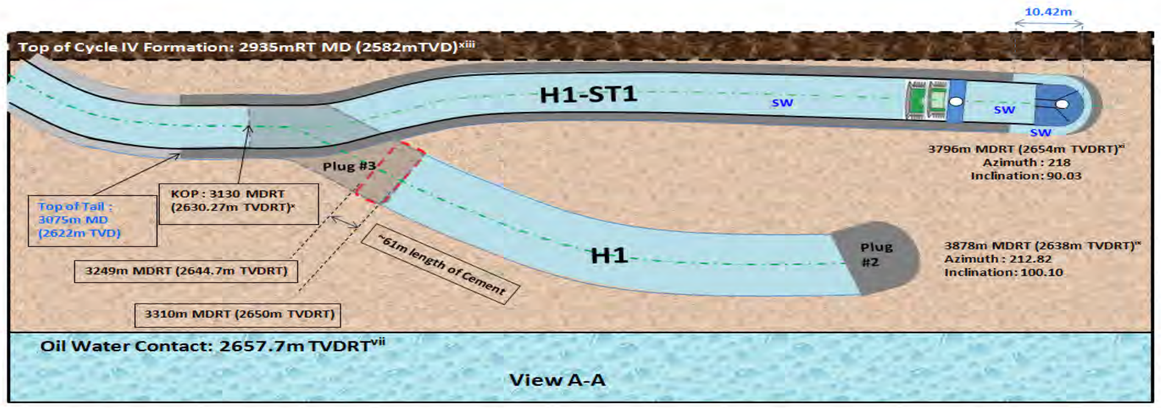
References		
#	NOPSA Doc No.	Description
i	EV0000530	Daily Drilling Report, H1 (#3)
ii	EV0000614	GI, H1 & H4 (Batch Drilled) Drilling Program Rev 2
iii	EV0000529	Daily Drilling Report, H1 (#2)
iv	EV0000534	Daily Drilling Report, H1 (#7)
v	EV0000530	Daily Drilling Report, H1 (#3)
vi	EV0000536	Daily Drilling Report, H1 (#9)
vii	EV0000614	GI, H1 & H4 (Batch Drilled) Drilling Program Rev 2, Appendix 6 Directional Program.
viii	EV0000538	Daily Drilling Report, H1 (#11)
ix	EV0000543	Daily Drilling Report, H1 (#16)
x	EV0000546	Daily Drilling Report, H1-ST1 (#1)
xi	EV0000552	Daily Drilling Report, H1-ST1 (#7)
xii	EV0000028	Cementing Calculations H-ST1, Rev-2
xiii	DB-30291-NOPSA-404	PTTEP Document Submission - Regulatory Approvals#3
xiv	DB-30291-NOPSA-359	Actual TVD of formation tops for H1 ST1 , H4 and GI ST1

Legend	
	Description
C	Annulus Space between 20" conductor and 13 3/8" Csg
B	Annulus Space between 13 3/8" Csg and 9-5/8" Csg
KOP	Kick off point









WAiT© Well Integrity Analysis

"As Built" Well Facts Post Overdisplacement

12-1/4" hole (9 5/8" Casing)

Extract from NOPSA Assumed facts verified by Expert Witness review of all documents:

52. The valve on the cement unit was then closed to hold the pressure in the casing at 1200 psi whilst the cement set. Following 'Wait on Cement' (WOC), a 9 5/8 inch MLS PCCC was installed on the H1-ST1 Well.

Well Integrity Condition

Primary Well Barrier(s) with respect to Actual Montara Cycle IV Formation as per SECTION 9.8.1, NORSOK D-010 STANDARD, REV 3, AUGUST 2004		
Element	Assessment	Traffic Light
1) 9 5/8 Casing	Pressure tested to 4000psi (2.76MPa) for 10 min, Good Test verifying the 9 5/8" Casing above the shoe track as a barrier.	Green
2) Cement Plug (Shoe Track)	1. Overdisplacement of 9bbl of seawater resulted in no cement within (6.61bbl) and around (2.39bbl) the 9 5/8" shoe. The EW has ASSUMED that 1m of the rat hole has been filled with seawater and the remaining volume of 1.9bbl shall displace the cement in the annulus, leaving 10.4m of reservoir with only a seawater column as the barrier against the Montara Cycle IV reservoir. 2. During the WOC period, surface pressure leaked from 1300 psi to 687 psi. This an indication that pressure was leaking off into the Montara Cycle IV formation through the "wet shoe", and is clear evidence that the 9 5/8" casing was in direct communication to the Montara Cycle IV reservoir, due to the compromised shoe track barrier. 3. Floats failed to hold the back pressure. Overdisplaced cement compromised shoe track (wet shoe). Incompetent barrier.	Red
3) Hydrostatic Column Inside Casing	0 to 73 psi underbalance to the Montara Cycle IV reservoir pressure ASSUMING a range of 1.04SG to 1.06 SG at top of Montara Cycle IV reservoir. This fluid column will not be considered as a competent well barrier according to Table 15.1 of the Norsok D-010 Standard that states: "The hydrostatic pressure shall at all times be equal to the estimated or measured pore/reservoir pressure, plus a defined safety margin".	Red
4) TOC (9-5/8" x 13-3/8")	Unverified TOC in annulus between 9-5/8" and 13-3/8" casings of H1-ST1 well. Unverified Barrier.	Yellow

Secondary Well Barrier(s) to Actual Montara Cycle IV Formation as per SECTION 9.8.1, NORSOK D-010 STANDARD, REV 3, AUGUST 2004		
Element	Assessment	Traffic Light
1) 13-3/8" x 20" TOC	TOC between 13-3/8" x 20" (C Annulus) had not been verified by logs or post cement job calculations. Should permeable zones exist within the unsealed "C" annulus (open shoe), and subsequent reduction of drilling fluid hydrostatic contained in the annuli, due to barite drop out occurring in the forseeable future, potential phenomena of Sustained Casing Pressure (SCP) cannot be ruled out.	Yellow
2) 13-3/8" Casing	Pressure tested to 3,000psi (20,684 kPa) for 15 min. Good test verifying the 13-3/8" casings as a barrier.	Green
3) BOP	BOP had been tested to 500psi (3.45 MPa) x 5 min (LOW) and 4000psi (27.58MPa) 10min (HIGH) on 19 February 2009. Next Test date 12 March 2009.	Green
4) Abandonment of H1	Estimated 61m length of cement plug (plug #2) and unverified bottom plug (plug #1) in abandoned H1 wellbore.	Red

3.1.12WI Status of H1-ST1 at Stage-1 Suspension

SW ISO Doc Number:	XLS-30291-NOPSA-001
Prepared By:	[illegible]
Reviewed By:	Colin Stuart
Date:	16-Feb-12
Revision Number:	1

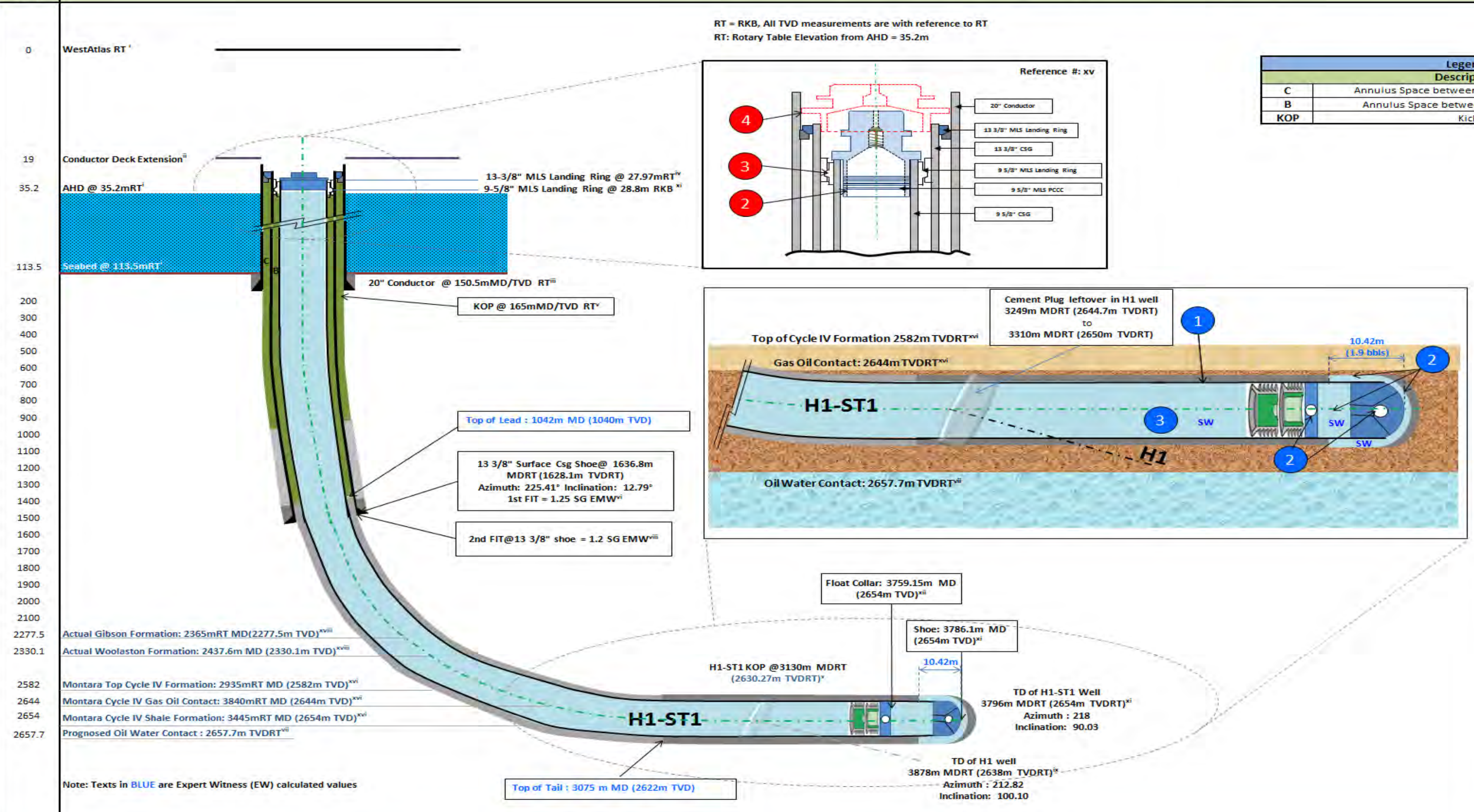
INVESTIGATION INTO THE UNCONTROLLED RELEASE OF HYDROCARBONS FROM THE MONTARA WELLHEAD PLATFORM ON THE 21 AUGUST 2009

EXPERT WITNESS REPORT

WAiT© #1- Well Integrity Status of H1/H1-ST1 from TD 12 ¼" to Stage 2 Suspension

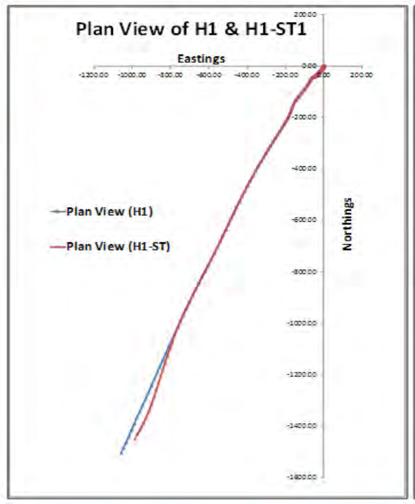
TVDRT (m) | **WI Status of H1-ST1 at Stage-1 Suspension (Panel 12 of 13)** | **7-Mar-09**

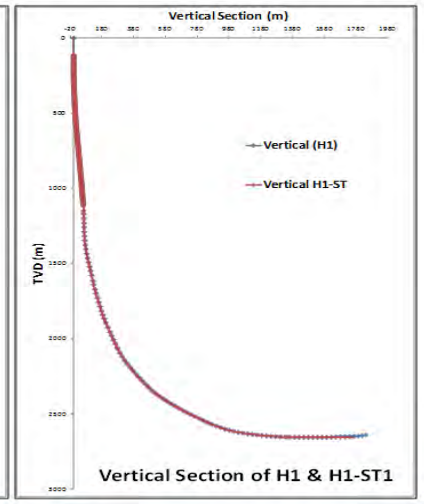
RT = RKB, All TVD measurements are with reference to RT
RT: Rotary Table Elevation from AHD = 35.2m



Legend	
	Description
C	Annulus Space between 20" conductor and 13 3/8" Csg
B	Annulus Space between 13 3/8" Csg and 9-5/8" Csg
KOP	Kick off point

References		
#	NOPSA Doc No.	Description
i	EV0000530	Daily Drilling Report, H1 (#3)
ii	EV0000614	GI, H1 & H4 (Batch Drilled) Drilling Program Rev
iii	EV0000529	Daily Drilling Report, H1 (#2)
iv	EV0000534	Daily Drilling Report, H1 (#7)
v	EV0000530	Daily Drilling Report, H1 (#3)
vi	EV0000536	Daily Drilling Report, H1 (#9)
vii	EV0000614	GI, H1 & H4 (Batch Drilled) Drilling Program Rev 2, Appendix 6 Directional Program.
viii	EV0000538	Daily Drilling Report, H1 (#11)
ix	EV0000543	Daily Drilling Report, H1 (#16)
x	EV0000546	Daily Drilling Report, H1-ST1 (#1)
xi	EV0000552	Daily Drilling Report, H1-ST1 (#7)
xii	EV0000028	Cementing Calculations H-ST1, Rev-1
xiii	-	D41-502433-FACOOM, Rev 3
xiv	EV0000802	WCCCF - Change to suspension plan for H1
xv	EV0000051	Montara Phase 1B, Drilling & Completion Program
xvi	DB-30291-NOPSA-404	PTTEP Document Submission - Regulatory Approvals#3
xvii	EV0000692	DDR Montara-H3 ST1 (03/04/09)
xviii	DB-30291-NOPSA-359	Actual TVD of formation tops for H1 ST1 , H4 and GI ST1





WAiT© Well Integrity Analysis

"As Built" Well Facts at Stage 1 Suspension

12-1/4" hole (9 5/8" Casing)

Extract from NOPSA Assumed facts verified by Expert Witness review of all documents:

52. The valve on the cement unit was then closed to hold the pressure in the casing at 1200 psi whilst the cement set. Following 'Wait on Cement' (WOC), a 9 5/8 inch MLS PCCC was installed on the H1-ST1 Well.

Well Integrity Condition

Primary Well Barrier(s) with respect to Actual Montara Cycle IV Formation as per SECTION 9.8.1, NORSOK D-010 STANDARD, REV 3, AUGUST 2004

Element	Assessment	Traffic light
1) 9 5/8 Casing	Pressure tested to 4000psi (2.76MPa) for 10 min, Good Test verifying the 9 5/8" Casing above the shoe track as a barrier.	
2) Cement Plug (Shoe Track)	1. Overdisplacement of 9bbl of seawater resulted in no cement within (6.61bbl) and around (2.39bbl) the 9 5/8" shoe. The EW has ASSUMED that 1m of the rat hole has been filled with seawater and the remaining volume of 1.9bbl shall displace the cement in the annulus, leaving 10.4m of reservoir with only a seawater column as the barrier against the Montara Cycle IV reservoir. 2. During the WOC period, surface pressure leaked from 1300 psi to 687 psi. This an indication that pressure was leaking off into the Montara Cycle IV formation through the "wet shoe", and is clear evidence that the 9 5/8" casing was in direct communication to the Montara Cycle IV reservoir, due to the compromised shoe track barrier. 3. Floats failed to hold the back pressure. Overdisplaced cement compromised shoe track (wet shoe). Incompetent barrier.	
3) Hydrostatic Column Inside Casing	0 to 73 psi underbalance to the Montara Cycle IV reservoir pressure ASSUMING a range of 1.04SG to 1.06 SG at top of Montara Cycle IV reservoir. This fluid column will not be considered as a competent well barrier according to Table 15.1 of the Norsok D-010 Standard that states: "The hydrostatic pressure shall at all times be equal to the estimated or measured pore/reservoir pressure, plus a defined safety margin".	
4) TOC (9-5/8" x 13-3/8")	Unverified TOC in annulus between 9-5/8" and 13-3/8" casings of H1-ST1 well. Unverified Barrier.	

Secondary Well Barrier(s) to Actual Montara Cycle IV Formation as per SECTION 9.8.1, NORSOK D-010 STANDARD, REV 3, AUGUST 2004

Element	Assessment	Traffic light
1) Surface Cement Plug	Replaced with 9 5/8" PCCC as per WCCCF006[xiv], and therefore non-existent as a barrier. In the expert's opinion the surface cement plug should not have been removed from the suspension program since a PCCC is not a barrier(s) as defined by PTTEP well construction standard[xiii].	
2) 9-5/8" PCCC	Manually installed with no torque measurements taken. No subsequent pressure test after installation. An unverified barrier.	
3) 13 3/8" x 9 5/8" MLS Hanger	No pressure sealing capability, hence non-existent as a barrier to provide surface annular isolation.	
4) 13 3/8" PCCC	The 13 3/8" PCCC was not installed as a mechanical surface barrier at this stage.	
5) BOP	The BOP was not a barrier because it was removed from the H1-ST1 Well and transferred to H3-ST1 on 3 Apr 09[xvii].	
6) 13-3/8" Casing	Pressure tested to 3,000psi (20,684 kPa) for 15 min. Good test verifying the 13-3/8" casings as a barrier.	

3.1.13WI Status of H1-ST1 at Stage 2 Suspension

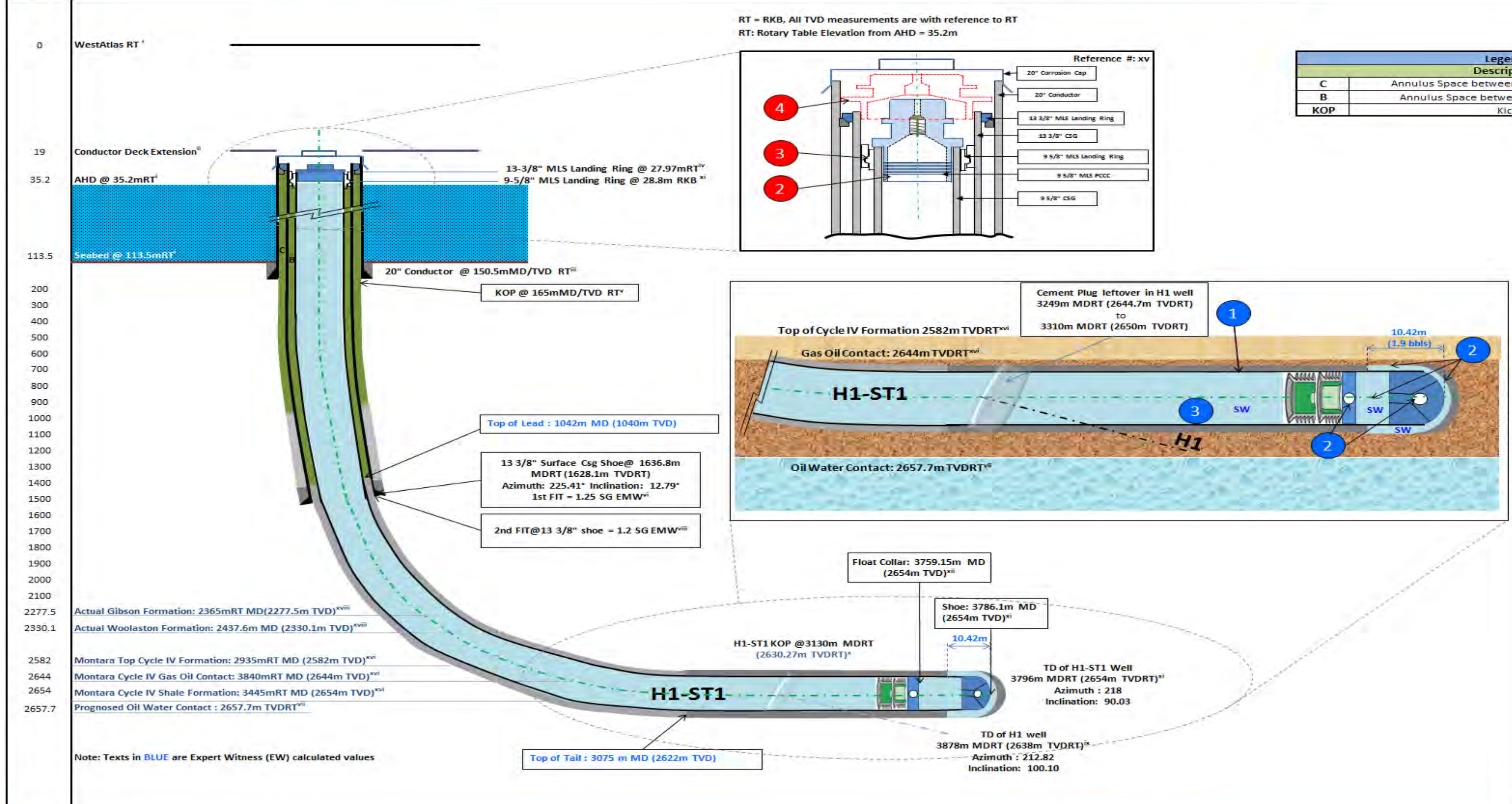
SW ISO Doc Number:	XLS-30291-NOPSA-001
Prepared By:	[illegible]
Reviewed By:	Colin Stuart
Date:	16-Feb-12
Revision Number:	1

INVESTIGATION INTO THE UNCONTROLLED RELEASE OF HYDROCARBONS FROM THE MONTARA WELLHEAD PLATFORM ON THE 21 AUGUST 2009

EXPERT WITNESS REPORT

WAiT© #1- Well Integrity Status of H1/H1-ST1 from TD 12 ¼" to Stage 2 Suspension

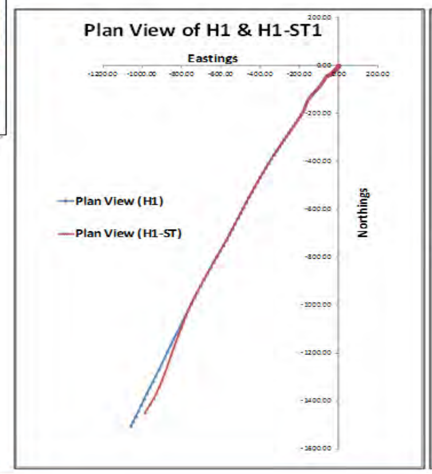
TVDRT (m) | WI Status of H1-ST1 at Stage 2 Suspension (Panel 13 of 13) | 16-Apr-09

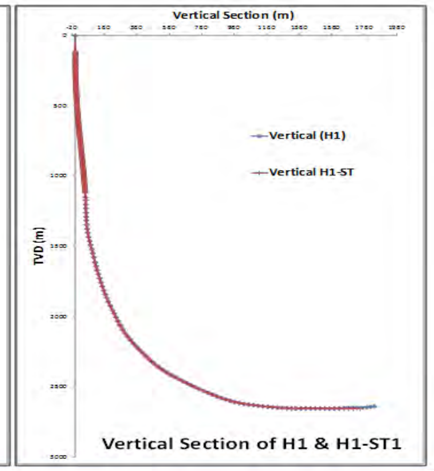


Legend	Description
C	Annulus Space between 20" conductor and 13 3/8" Csg
B	Annulus Space between 13 3/8" Csg and 9-5/8" Csg
KOP	Kick off point

References

#	NOPSA Doc No.	Description
i	EV0000530	Daily Drilling Report, H1 (#3)
ii	EV0000614	GI, H1 & H4 (Batch Drilled) Drilling Program Rev
iii	EV0000529	Daily Drilling Report, H1 (#2)
iv	EV0000534	Daily Drilling Report, H1 (#7)
v	EV0000530	Daily Drilling Report, H1 (#3)
vi	EV0000536	Daily Drilling Report, H1 (#9)
vii	EV0000614	GI, H1 & H4 (Batch Drilled) Drilling Program Rev 2, Appendix 6 Directional Program.
viii	EV0000538	Daily Drilling Report, H1 (#11)
ix	EV0000543	Daily Drilling Report, H1 (#16)
x	EV0000546	Daily Drilling Report, H1-ST1 (#1)
xi	EV0000552	Daily Drilling Report, H1-ST1 (#7)
xii	EV0000028	Cementing Calculations H-ST1, Rev-1
xiii	-	D41-502433-FACCOM, Rev 3
xiv	EV0000802	WCCCF - Change to suspension plan for H1
xv	EV0000051	Montara Phase 1B, Drilling & Completion Program
xvi	DB-30291-NOPSA-404	PTTEP Document Submission - Regulatory Approvals#3
xvii	EV0000692	DDR Montara-H3-ST1 (03/04/09)
xviii	DB-30291-NOPSA-359	Actual TVD of formation tops for H1 ST1 , H4 and GI ST1





WAiT© Well Integrity Analysis

"As Built" Well Facts at Stage 2 Suspension

12-1/4" hole (9 5/8" Casing)

Extract from NOPSA Assumed facts verified by Expert Witness review of all documents:

73. On the 13 April 2009, PTTEPAA recorded the day's activities on a Daily Drilling Report relating to the Montara H2 well operations². Page 3 of the report stated in the 'Comments & Lessons Learned' column "*Laid out H1 340mm casing stump and running tool.*"

74. On the 14 April 2009, PTTEPAA recorded the day's activities on a Daily Drilling Report relating to the Montara H2 well operations. Page 3 of the report stated in the 'Comments & Lessons Learned' column "*H1 & H3 ST1 340mm casing removed above MLS.*"

75. The West Atlas Drilling Supervisor emailed the PTTEPAA Well Construction Manager and the Drilling Superintendent and others, a Montara WHP report for the 13-04-2009. On page 1 under the heading Comments/Activities it states "*B/O 340mm MLS and laid out same with 340mm casing joint on well H1.*"

76. On the 15 April 2009, PTTEPAA recorded the day's activities on a Daily Drilling Report relating to the Montara H2 well operations. Page 3 of the report stated in the 'Comments & Lessons Learned' column "*H1 & H3 ST1 340mm casing removed above MLS.*" ... "*H1 & H3 ST1 508mm casing ported joints removed from above MLS.*"

77. On the 16 April 2009, PTTEPAA recorded the day's activities on a Daily Drilling Report relating to the Montara H2 well operations. Page 3 of the report stated in the 'Comments & Lessons Learned' column "*Corrosion caps fitted to 340mm MLS and trash caps fitted to 508mm conductors on H1 and H3-ST1.*"

78. The West Atlas Drilling Supervisor emailed the PTTEPAA Well Construction Manager and PTTEPAA Drilling Superintendent and others a Montara WHP report for the 15-04-2009. On page 2 under the heading Comments/Activities it states "*Rigged up and B/O 508mm ported conductor joint on H1 and H3-ST1 – Ok. Corrosion caps and trash caps should be installed by late afternoon.*"

79. The PTTEPAA Extra Drilling Supervisor supervised West Atlas drilling personnel in the removal of the 20 inch and 13 3/8 inch casings above the MLS hanger. He then supervised the West Atlas drilling personnel in the installation of a 20 inch MLS trash cap over the 20" MLS hanger. This had the adverse effect of hiding the 13 3/8 inch MLS hanger from sight.

80. The 13 3/8 inch MLS PCCC was not installed in the H1-ST1 Well.

81. PTTEPAA were unable to provide NOPSA with evidence that between the 7 March 2009 and the 21 April 2009, they had instructed the West Atlas OIM to install the 13 3/8 inch MLS PCCC as a secondary barrier against a blow-out. Nor have they been able to provide a satisfactory explanation as to why the 13 3/8 inch MLS PCCC was not installed on the H1-ST1 Well.

WELL INTEGRITY CONDITION

Primary Well Barrier(s) with respect to Actual Montara Cycle IV Formation as per SECTION 9.8.1, NORSOK D-010 STANDARD, REV 3, AUGUST 2004

Element	Assessment	Traffic light
1) 9 5/8 Casing	Pressure tested to 4000psi (2.76MPa) for 10 min, Good Test verifying the 9 5/8" Casing above the shoe track as a barrier.	(Green)
2) Cement Plug (Shoe Track)	1. Overdisplacement of 9bbl of seawater resulted in no cement within (6.61bbl) and around (2.39bbl) the 9 5/8" shoe. The EW has ASSUMED that 1m of the rat hole has been filled with seawater and the remaining volume of 1.9bbl shall displace the cement in the annulus, leaving 10.4m of reservoir with only a seawater column as the barrier against the Montara Cycle IV reservoir. 2. During the WOC period, surface pressure leaked from 1300 psi to 687 psi. This an indication that pressure was leaking off into the Montara Cycle IV formation through the "wet shoe", and is clear evidence that the 9 5/8" casing was in direct communication to the Montara Cycle IV reservoir, due to the compromised shoe track barrier. 3. Floats failed to hold the back pressure. Overdisplaced cement compromised shoe track (wet shoe). Incompetent barrier.	(Red)
3) Hydrostatic Column Inside Casing	0 to 73 psi underbalance to the Montara Cycle IV reservoir pressure ASSUMING a range of 1.04SG to 1.06 SG at top of Montara Cycle IV reservoir. This fluid column will not be considered as a competent well barrier according to Table 15.1 of the Norsok D-010 Standard that states: "The hydrostatic pressure shall at all times be equal to the estimated or measured pore/reservoir pressure, plus a defined safety margin".	(Red)
4) TOC (9-5/8" x 13-3/8")	Unverified TOC in annulus between 9-5/8" and 13-3/8" casings of H1-ST1 well. Unverified Barrier.	(Amber)

Secondary Well Barrier(s) to Actual Montara Cycle IV Formation as per SECTION 9.8.1, NORSOK D-010 STANDARD, REV 3, AUGUST 2004

Element	Assessment	Traffic light
1) Surface Cement Plug	Replaced with 9 5/8" PCCC as per WCCCF006[xiv], and therefore non-existent as a barrier. In the expert's opinion the surface cement plug should not have been removed from the suspension program since a PCCC is not a barrier(s) as defined by PTTEP well construction standard[xiii].	(Red)
2) 9-5/8" PCCC	Manually installed with no torque measurements taken. No subsequent pressure test after installation. An unverified barrier.	(Amber)
3) 13 3/8" x 9 5/8" MLS Hanger	No pressure sealing capability, hence non-existent as a barrier to provide surface annular isolation.	(Red)
4) 13 3/8" PCCC	The 13-3/8"PCCC was not installed, or even if installed, not qualified as a barrier as it was not pressure containing[xv].	(Red)
5) BOP	The BOP was not a barrier because it was removed from the H1-ST1 Well and transferred to H3-ST1 on 3 Apr 09[xvii].	(Red)
6) 13-3/8" Casing	Pressure tested to 3,000psi (20,684 kPa) for 15 min. Good test verifying the 13-3/8" casings as a barrier.	(Green)

3.2 WAiT © #2 – Well Integrity Status of H1-ST1 from Re-Entry to Blowout

WAiT© #2 includes:

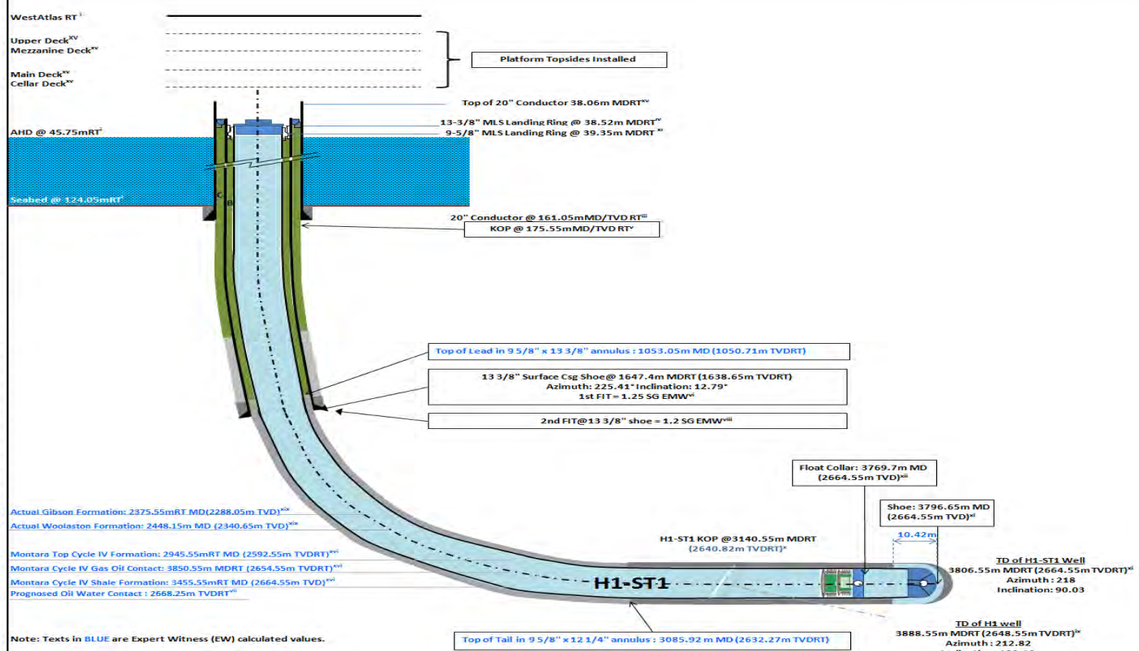
1. WI Status of H1-ST1 - Removal of 20" (508mm)Trash Cap
2. WI Status of H1-ST1 - Pressure Check Below 9 5/8" MLS PCCC
    a. H1-ST1 9 5/8" PCCC Pressure Test: Scenario 1
    b. H1-ST1 9 5/8" PCCC Pressure Test: Scenario 2
    c. H1-ST1 9 5/8" PCCC Pressure Test: Scenario 3
3. WI Status of H1-ST1 - Removal of 9 5/8" MLS PCCC
4. WI Status of H1-ST1 - Wellflow Observed
5. WI Status of H1-ST1 – Evacuation

3.2.1 WI Status of H1-ST1 - Removal of 20" (508mm) Trash Cap

SW ISO Doc Number:	XLS-30291-NOPSA-002
Prepared By:	Myo / Linus / Sean / Yeo Min
Reviewed By:	Colin Stuart
Date:	16-Feb-12
Revision Number:	1

INVESTIGATION INTO THE UNCONTROLLED RELEASE OF HYDROCARBONS FROM THE MONTARA WELLHEAD PLATFORM ON THE 21 AUGUST 2009
EXPERT WITNESS REPORT
WAiT© #2 – Well Integrity Status of H1-ST1 from Re-Entry to Blowout

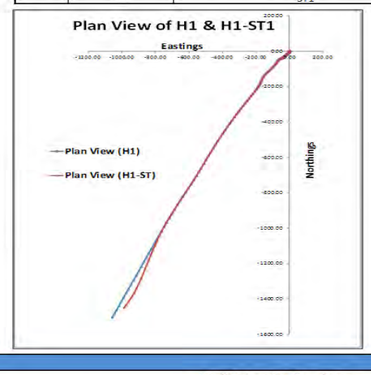
TVDRT (m) | **WI Status of H1-ST1 - Removal of 20" (508mm)Trash Cap[xiv] (Panel 1 of 5)** | **20 August 2009, 0600Hrs[xiv]**

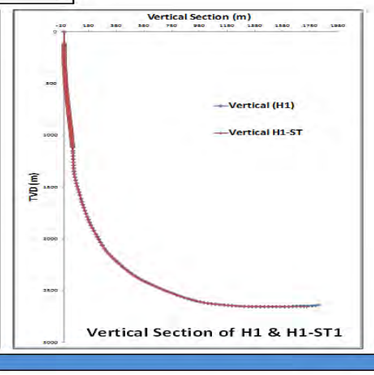


RT – RKB, All TVD measurements are with reference to RT
RT: Rotary Table Elevation from AHD = 45.75m[xv]
*All depths measurements offset by 10.55m from 35.2m

References		
#	NOPSA Doc No.	Description
i	EV0000530	Daily Drilling Report, H1 (#3)
ii	EV0000614	GI, H1 & H4 (Batch Drilled) Drilling Program Rev 1
iii	EV0000529	Daily Drilling Report, H1 (#2)
iv	EV0000534	Daily Drilling Report, H1 (#7)
v	EV0000530	Daily Drilling Report, H1 (#3)
vi	EV0000536	Daily Drilling Report, H1 (#9)
vii	EV0000614	GI, H1 & H4 (Batch Drilled) Drilling Program Rev 2, Appendix 6 Directional Program.
viii	EV0000538	Daily Drilling Report, H1 (#11)
ix	EV0000543	Daily Drilling Report, H1 (#16)
x	EV0000546	Daily Drilling Report, H1-ST1 (#1)
xi	EV0000552	Daily Drilling Report, H1-ST1 (#7)
xii	EV0000028	Cementing Calculations H-ST1, Rev-1
xiii	-	D41-502433-FACOOM, Rev 3
xiv	EV0000555	Daily Drilling Report, H1-ST1 (#12)
xv	EV0000051	Montara Phase 1B Drilling & Completion Program
xvi	DB-30291-NOPSA-404	PTTEP Document Submission - Regulatory Approvals#3
xvii	EV0000692	DDR Montara-H3-ST1 (03/04/09)
xviii	EV0000802	WCCCF - Change to suspension plan for H1
xix	DB-30291-NOPSA-359	Actual TVD of formation tops for H1 ST1 , H4 and GI ST1

Legend	
Description	
C	Annulus Space between 20" conductor and 13 3/8" Csg
B	Annulus Space between 13 3/8" Csg and 9-5/8" Csg
KOP	Kick off point





"As Built" Well Facts at Removal of 20" (508mm) Trash Cap

12-1/4" hole (9 5/8" Casing)

Extract from NOPSA Assumed facts verified by Expert Witness review of all documents:

100. PTTEPAA recorded the day's activities on a Daily Drilling Report relating to the Montara H1 ST1 well operations.
101. PTTEPAA recorded the day's activities on a Daily Drilling Report relating to the Montara GI ST1 well operations.
102. At 3:30 am, the West Atlas MODU facility removed the Montara WHP facility helideck's hatch cover for the H1-ST1 Well.
103. At 4.30 am, the West Atlas was skidded over the H1-ST1 Well, in preparation to remove the: 20 inch MLS trash cap; the 13 3/8 inch MLS PCCC and the 9 5/8 inch MLS PCCC from the well, in accordance with the Montara Phase 1B Drilling and Completion Program Rev 0.
104. At 4:40 am, the West Atlas MODU skidded its drill package so that its rotary table was over the H1-ST1 Well.
105. At 6 am, the West Atlas drilling crew removed the 20 inch MLS trash cap from the H1-ST1 Well. PTTEPAA discovered that there was no 13 3/8 inch MLS PCCC installed on the MLS hanger. This was contrary to the record in the PTTEPAA Daily Drilling Report and as detailed in the above mentioned drilling and completion program.
106. As a consequence of the missing 13 3/8 inch MLS PCCC the sealing surfaces and the threads of the MLS hanger at the top of the 13 3/8 inch casing had been exposed to a marine environment for approximately 5 months and were rusted and dirty. These threads needed to be clean and damage free so that when the 13 3/8 casing riser was run and screwed in to the 13 3/8 inch MLS hanger it could achieve an effective pressure seal.
107. PTTEPAA onshore and offshore drilling supervisors were advised of the missing 13 3/8 inch MLS PCCC at the time.
108. PTTEP onshore and offshore drilling supervisors agreed that the rusted and dirty threads needed to be cleaned. The 9 5/8 inch MLS PCCC would have interfered with the running of the 13 3/8 inch MLS thread cleaning tool. Subsequently, PTTEPAA instructed the West Atlas drilling crew to remove the 9 5/8 inch MLS PCCC from the HI-ST1 well.

WAIT© Well Integrity Analysis

Primary Well Barrier (s) with respect to Actual Montara Cycle IV Formation as per SECTION 9.8.1, NORSOK D-010 STANDARD, REV 3, AUGUST 2004

Element	Well Integrity Condition – Assessment	Traffic Light
1) 9 5/8" Casing	Pressure tested to 4000psi (2.76MPa) for 10 min, Good Test verifying the 9 5/8" Casing above the shoe track as a barrier.	
2) Cement Plug (Shoe Track)	1. Overdisplacement of 9bbl of seawater resulted in no cement within (6.61bbl) and around (2.39bbl) the 9 5/8" shoe. The EW has ASSUMED that 1m of the rat hole has been filled with seawater and the remaining volume of 1.9bbl shall displace the cement in the annulus, leaving 10.4m of reservoir with only a seawater column as the barrier against the Montara Cycle IV reservoir. 2. During the WOC period, surface pressure leaked from 1300 psi to 687 psi. This an indication that pressure was leaking off into the Montara Cycle IV formation through the "wet shoe", and is clear evidence that the 9 5/8" casing was in direct communication to the Montara Cycle IV reservoir, due to the compromised shoe track barrier. 3. Floats failed to hold the back pressure. Overdisplaced cement compromised shoe track (wet shoe). Incompetent barrier.	
3) Hydrostaric Column inside casing (Sea water: 1.04 SG)	0 to 73 psi underbalance to the Montara Cycle IV reservoir pressure ASSUMING a range of 1.04SG to 1.06 SG at top of Montara Cycle IV reservoir. This fluid column will not be considered as a competent well barrier according to Table 15.1 of the Norsok D-010 Standard that states: "The hydrostatic pressure shall at all times be equal to the estimated or measured pore/reservoir pressure, plus a defined safety margin".	
4) TOC (9-5/8" x 13-3/8")	Unverified TOC in annulus between 9-5/8" and 13-3/8" casings of H1-ST1 well. Unverified Barrier.	

Secondary Well Barrier(s) with respect to Actual Montara Cycle IV Formation as per SECTION 9.8.1, NORSOK D-010 STANDARD, REV 3, AUGUST 2004

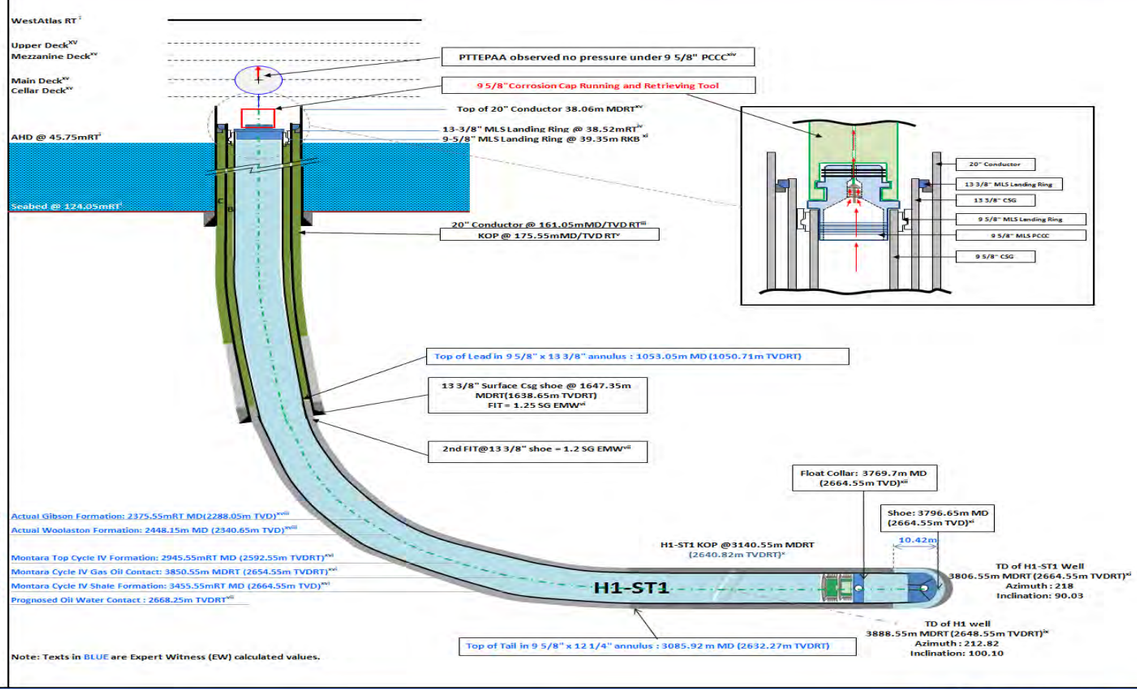
Element	Well Integrity Condition – Assessment	Traffic Light
1) Surface Cement Plug	Replaced with 9 5/8" PCCC as per WCCCF006[xvii], and therefore non-existent as a barrier. In the expert's opinion the surface cement plug should not have been removed from the suspension program since a PCCC is not a barrier(s) as defined by PTTEP well construction standard[xvi].	
2) 9-5/8" PCCC	Manually installed with no torque measurements taken. No subsequent pressure test after installation. An unverified barrier.	
3) 13 3/8" x 9 5/8" MLS Hanger	No pressure sealing capability, hence non-existent as a barrier to provide surface annular isolation.	
4) 13 3/8" PCCC	Was not installed, or even if installed, not qualified as a barrier as it was not pressure containing.	
5) BOP	The BOP was not a barrier because it was removed from the H1-ST1 Well and transferred to H3-ST1 on 3 Apr 09'[xvii].	
6) 13-3/8" Casing	Pressure tested to 3,000psi (20,684 kPa) for 15 min. Good test verifying the 13-3/8" casings as a barrier.	

3.2.2 WI Status of H1-ST1 - Pressure Check Below 9 5/8" MLS PCCC

SW ISO Doc Number:	XLS-30291-NOPSA-002
Prepared By:	Myo / Linus / Sean / Yeo Min
Reviewed By:	Colin Stuart
Date:	16-Feb-12
Revision Number:	1

INVESTIGATION INTO THE UNCONTROLLED RELEASE OF HYDROCARBONS FROM THE MONTARA WELLHEAD PLATFORM ON THE 21 AUGUST 2009
EXPERT WITNESS REPORT
WAiT© #2 – Well Integrity Status of H1-ST1 from Re-Entry to Blowout

TVDRT (m) | **WI Status of H1-ST1 - Pressure Check Below 9 5/8" MLS PCCC (Panel 2 of 5)** | **20 August 2009, 1130 Hrs[xiv]**

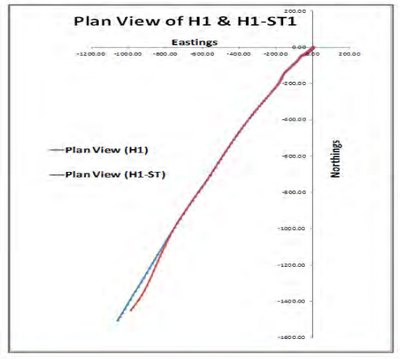


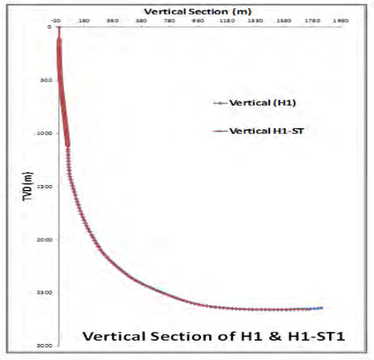
Note: Texts in BLUE are Expert Witness (EW) calculated values.

RT = RKB, All TVD measurements are with reference to RT
RT: Rotary Table Elevation from AHD = 45.75m[xv]
*All depths measurements offset by 10.55m from 35.2m

References		
#	NOPSA Doc No.	Description
i	EV0000530	Daily Drilling Report, H1 (#3)
ii	EV0000614	GI, H1 & H4 (Batch Drilled) Drilling Program Rev 1
iii	EV0000529	Daily Drilling Report, H1 (#2)
iv	EV0000534	Daily Drilling Report, H1 (#7)
v	EV0000530	Daily Drilling Report, H1 (#3)
vi	EV0000536	Daily Drilling Report, H1 (#9)
vii	EV0000614	GI, H1 & H4 (Batch Drilled) Drilling Program Rev 2, Appendix 6 Directional Program.
viii	EV0000538	Daily Drilling Report, H1 (#11)
ix	EV0000543	Daily Drilling Report, H1 (#16)
x	EV0000546	Daily Drilling Report, H1-ST1 (#1)
xi	EV0000552	Daily Drilling Report, H1-ST1 (#7)
xii	EV0000028	Cementing Calculations H-ST1, Rev-1
xiii	-	D41-S02433-FACOOM, Rev 3
xiv	EV0000555	Daily Drilling Report, H1-ST1 (#12)
xv	EV0000051	Montara Phase 1B Drilling & Completion Program
xvi	DB-30291-NOPSA-404	PTTEP Document Submission - Regulatory Approvals#3
xvii	EV0000692	DDR Montara-H3-ST1 (03/04/09)
xviii	DB-30291-NOPSA-359	Actual TVD of formation tops for H1 ST1 , H4 and GI ST1

Legend	
	Description
C	Annulus Space between 20" conductor and 13 3/8" Csg
B	Annulus Space between 13 3/8" Csg and 9-5/8" Csg
KOP	Kick off point





WAiT© Well Integrity Analysis

"As Built" Well Facts at Pressure Check below 9 5/8" PCCC

12-1/4" hole (9 5/8" Casing)

Extract from NOPSA Assumed facts verified by Expert Witness review of all documents:

110. As a result of the scale build up on the 13 3/8 PCCC on the H1-ST1 well, a supplementary plan to the Montara Platform Forward Plan, number 1b – 20 inch tie back for 19 August 09. Versions 2.0 was issued
111. Around 11.30 am, the 9 5/8 inch MLS PCCC was removed from the H1-ST1 Well after testing for any signs of pressure under the PCCC.

Extract from H1-ST1 well DDR on the 20 Aug 2009 (EV0000555)

1) Picked up Vecto 'J' slot pressure containing corrosion cap running/retrieval (R/R) tool with internal pin installed and made up to a stand of 140mm HWDP.

2) Run in hole with Vecto pressure containing corrosion cap R/R tool (pressure control through IBOP).

Well Integrity Condition

Primary Well Barrier(s) with respect to Actual Montara Cycle IV Formation as per SECTION 9.8.1, NORSOK D-010 STANDARD, REV 3, AUGUST 2004

Element	Assessment	Traffic Light
1) 9 5/8" Casing	Pressure tested to 4000psi (2.76MPa) for 10 min, Good Test verifying the 9 5/8" Casing above the shoe track as a barrier.	
2) Cement Plug (Shoe Track)	1. Overdisplacement of 9bbl of seawater resulted in no cement within (6.61bbl) and around (2.39bbl) the 9 5/8" shoe. The EW has ASSUMED that 1m of the rat hole has been filled with seawater and the remaining volume of 1.9bbl shall displace the cement in the annulus, leaving 10.4m of reservoir with only a seawater column as the barrier against the Montara Cycle IV reservoir. 2. During the WOC period, post overdisplacement, surface pressure leaked from 1300 psi to 687 psi. This an indication that pressure was leaking off into the Montara Cycle IV formation through the "wet shoe", and is clear evidence that the 9 5/8" casing was in direct communication to the Montara Cycle IV reservoir, due to the compromised shoe track barrier. 3. Floats failed to hold the back pressure. Overdisplaced cement compromised shoe track (wet shoe).	
3) Hydrostaric Column inside casing (Sea water: 1.04 SG)	0 to 73 psi underbalance to the Montara Cycle IV reservoir pressure ASSUMING a range of 1.04SG to 1.06 SG at top of Montara Cycle IV reservoir. This fluid column will not be considered as a competent well barrier according to Table 15.1 of the Norsok D-010 Standard that states: "The hydrostatic pressure shall at all times be equal to the estimated or measured pore/reservoir pressure, plus a defined safety margin".	
4) Positive Pressure (Theoretical) under the 9 5/8" PCCC	Potential positive pressure under the PCCC may have been inadvertently bled off in a number of scenarios. **(See following scenario 1 -3)**	
5) TOC (9-5/8" x 13-3/8")	Unverified TOC in annulus between 9-5/8" and 13-3/8" casings of H1-ST1 well. Unverified Barrier.	

Secondary Well Barrier(s) with respect to Actual Montara Cycle IV Formation as per SECTION 9.8.1, NORSOK D-010 STANDARD, REV 3, AUGUST 2004

Eelement	Assessment	Traffic Light
1) Surface Cement Plug	Replaced with 9 5/8" PCCC as per WCCCF006, and therefore non-existent as a barrier. In the expert's opinion the surface cement plug should not have been removed from the suspension program since a PCCC is not a barrier(s) as defined by PTTEP well construction standard[xiii].	
2) 13 3/8" x 9 5/8" MLS Hanger	No pressure sealing capability, hence non-existent as a barrier to provide surface annular isolation.	
3) 13 3/8" PCCC	Was not installed, or even if installed, not qualified as a barrier as it was not pressure containing.	
4) 9-5/8" PCCC	Manually installed with no torque measurements taken. No subsequent pressure test after installation. An unverified barrier.	
5) BOP	The BOP was not a barrier because it was removed from the H1-ST1 Well and transferred to H3-ST1 on 3 Apr 09[xvii].	
6) 13-3/8" Casing	Pressure tested to 3,000psi (20,684 kPa) for 15 min. Good test verifying the 13-3/8" casings as a barrier.	

3.2.2.1 H1-ST1 9 5/8" PCCC Pressure Check: Scenario 1

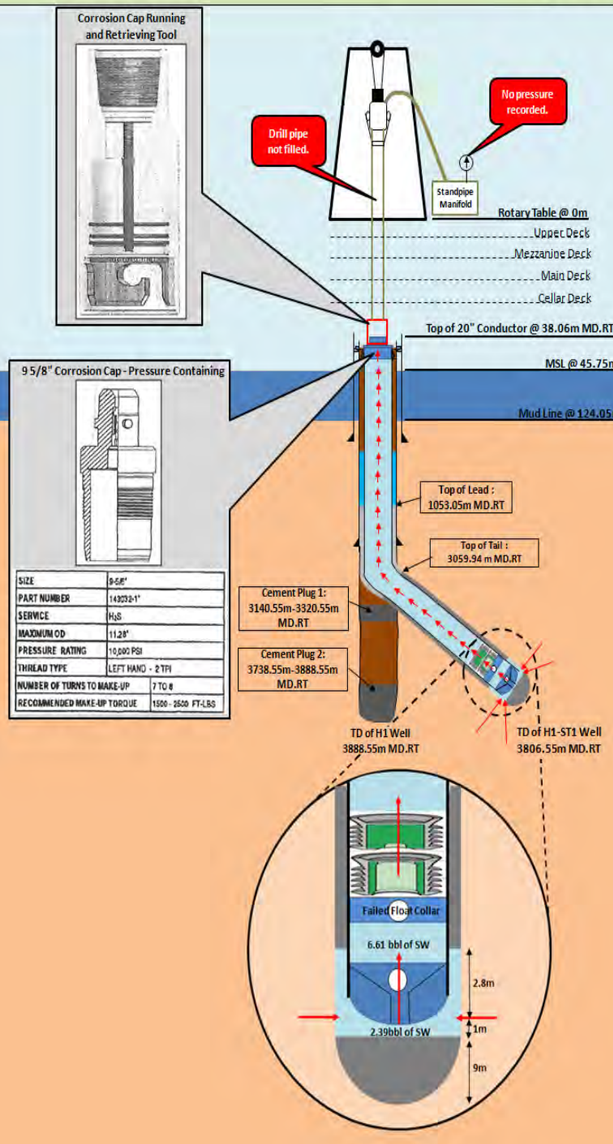
SW ISO Doc Number:	XLS-30291-NOPSA-002
Prepared By:	Myo / Linus / Sean / Yeo Min
Reviewed By:	Colin Stuart
Date:	16-Feb-12
Revision Number:	1

INVESTIGATION INTO THE UNCONTROLLED RELEASE OF HYDROCARBONS FROM THE MONTARA WELLHEAD PLATFORM ON THE 21 AUGUST 2009

EXPERT WITNESS REPORT

WAiT© #2 – Well Integrity Status of H1-ST1 from Re-Entry to Blowout

H1-ST1 9 5/8" PCCC Pressure Check: Scenario 1 — **20 August 2009, 1130 Hrs**



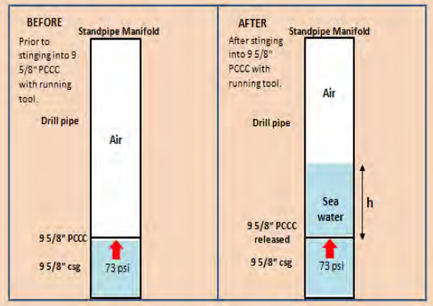
Pressure Check under 9 5/8" MLS PCCC (Assuming Drill Pipe not filled)

In view of the fact that the EW did not find any information in relation to the status of the drill pipe being filled with fluid or being empty during the pressure testing of the 9 5/8" MLS PCCC (as referenced from H1-ST1 Well DDR EV0000555 on the 20 Aug 2009), the following assumptions were made to determine the likely scenario where the pipe was empty and a small pressure was read on the pressure gauge at the standpipe manifold.

-From DB-30291-NOPSA-404 "PTTEP Document Submission - Regulatory Approvals#3", the depth of top cycle IV reservoir was given as 2585m TVD.RT.
-From EV0000538-EV0000553 "Daily Drilling Report" the cycle IV reservoir pore pressure specific gravity was given as 1.06 SG. Using these values, the calculated hydrostatic pressure of the formation was 3889psi.
- From EV0000028 "Workbook containing 6 worksheets including Coogee Resources", the seawater specific gravity was given as 1.04 SG. Using these values, the calculated hydrostatic pressure of the seawater from RT to top of cycle IV reservoir was 3816psi.
- An averaged drill pipe capacity of 0.0693 bbl/m based on an OD of 5.5" from EV0000555 was assumed by SWPL in this calculation this was because no information was provided for the exact specification of the drill pipe used.
- Ideal gases were assumed for this calculation.

This would give an **underbalance pressure** just below the bottom of the 9 5/8" MLS PCCC to be **73psi.**
The EW attempts to determine the pressure that would be recorded on the pressure gauge located on the standpipe manifold.
Boyle's law was used for this analysis which describes the inverse relationship of pressure and volume of an ideal gas. The volume considered for this analysis was the sum of the drill pipe volume, the swivel volume, the flexible hose volume and the standpipe volume in accordance to the IADC Class 5 Rig Specification Chapter R Section 4 Page 1 "Description of Surface Equipment Types" Type 4. Due to the difference in ID for individual components, an effective capacity was used to represent the capacity of the combined components which is 0.0191 bbl/ft.

Boyles Law states: P1V1 = P2V2
Initial State = Final State



On release of pressure using the 9 5/8" running tool into the 9 5/8" MLS PCCC, a column of seawater is assumed to be displaced to a height "h" in the drill pipe, swivel, hose and standpipe. This column of displaced seawater would compress the initial volume of air contain in the similar space. The height "h" could be calculated using the equation below which describes the above scenario.

P1V1 = ((Underbalance Pressure - (SW pressure gradient x h)) x (Total length - h) x Effective Capacity
h = 34.4m has been calculated by EW to be the height equivalent of seawater entering the drillpipe and compressing the air above to maintain the required 73 psi at the 9 5/8" PCCC depth.

With the height of seawater calculated, the pressure at the standpipe manifold gauge was calculated to be **23.4 psi.**

If a 10k psi instrument gauge was being used (conjecture?) this pressure would not have been detected.
In any case, the standing instructions in the re-entry procedures- Drilling Programme 1B (EV0000051) , it was highlighted that any identification of pressure below the 9 5/8" PCCC would be to "record pressure and bleed off".

3.2.2.2 H1-ST1 9 5/8" PCCC Pressure Check: Scenario 2

SW ISO Doc Number:	XLS-30291-NOPSA-002
Prepared By:	Myo / Linus / Sean / Yeo Min
Reviewed By:	Colin Stuart
Date:	16-Feb-12
Revision Number:	1

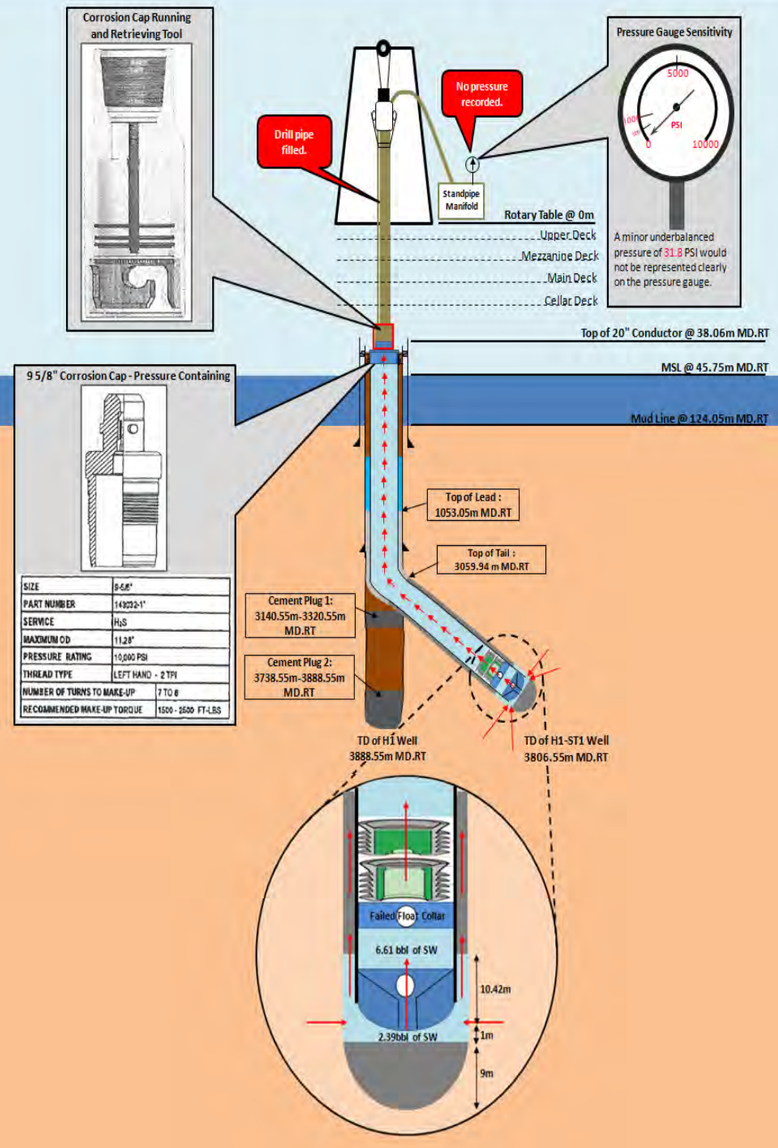
INVESTIGATION INTO THE UNCONTROLLED RELEASE OF HYDROCARBONS FROM THE MONTARA WELLHEAD PLATFORM ON THE 21 AUGUST 2009

EXPERT WITNESS REPORT

WAiT© #2 – Well Integrity Status of H1-ST1 from Re-Entry to Blowout

H1-ST1 9 5/8" PCCC Pressure Check: Scenario 2

20 August 2009, 1130 Hrs



	SG	ppg	psi/ft	Depth (ft)	Hyd Pressure (psi)
Sea Water	1.04	8.66	0.45	8471	3816
Reservoir	1.06	8.83	0.46	8471	3889
Drill pipe fluid (seawater)	1.04	8.66	0.45	92	42
Pressure Difference with additional drill pipe column of fluid	31.8	Underbalanced			

Pressure Check under 9 5/8" MLS PCCC (Assuming Drill Pipe filled)

In view of the fact that the EW did not find any information in relation to the status of the drill pipe being filled with fluid or being empty during the pressure testing of the 9 5/8" MSL PCCC (as referenced from H1-ST1 Well DDR EV0000555 on the 20 Aug 2009), the following assumptions were made where the pipe was filled with seawater and a small pressure was read on the pressure gauge at the standpipe manifold.

-From DB-30291-NOPSA-404 "PTTEP Document Submission - Regulatory Approvals#3", the depth of top cycle IV reservoir was given as 2585m TVD.RT.
- From EV0000538-EV0000553 "Daily Drilling Report" the cycle IV reservoir pore pressure specific gravity was given as 1.06 SG. Using these values, the calculated hydrostatic pressure of the formation was 3889psi.
- From EV0000028 "Workbook containing 6 worksheets including Coogee Resources", the seawater specific gravity was given as 1.04 SG. Using these values, the calculated hydrostatic pressure of the seawater from RT to top of cycle IV reservoir was 3816psi.

Therefore, the most likely trapped pressure below the 9 5/8" PCCC is 73 psi based on the Expert's calculation.

With an additional column of seawater in the drill pipe, that would have further reduced the underbalanced pressure to 31.8psi , because of the additional hydrostatic pressure exerted by the seawater column in the drill pipe exerted by the seawater column in the drill pipe after the 9 5/8" PCCC retrival tool was stung into the 9 5/8" PCCC.

If a 10k psi instrument gauge was being used (conjecture?) this pressure would not have been detected.
In any case, the standing instructions in the re-entry procedures- Drilling Programme 1B (EV0000051), it was highlighted that any identification of pressure below the 9 5/8" PCCC would be to "record pressure and bleed off".

3.2.2.3 H1-ST1 9 5/8" PCCC Pressure Check: Scenario 3

SW ISO Doc Number:	XLS-30291-NOPSA-002
Prepared By:	Myo / Linus / Sean / Yeo Min
Reviewed By:	Colin Stuart
Date:	16-Feb-12
Revision Number:	1

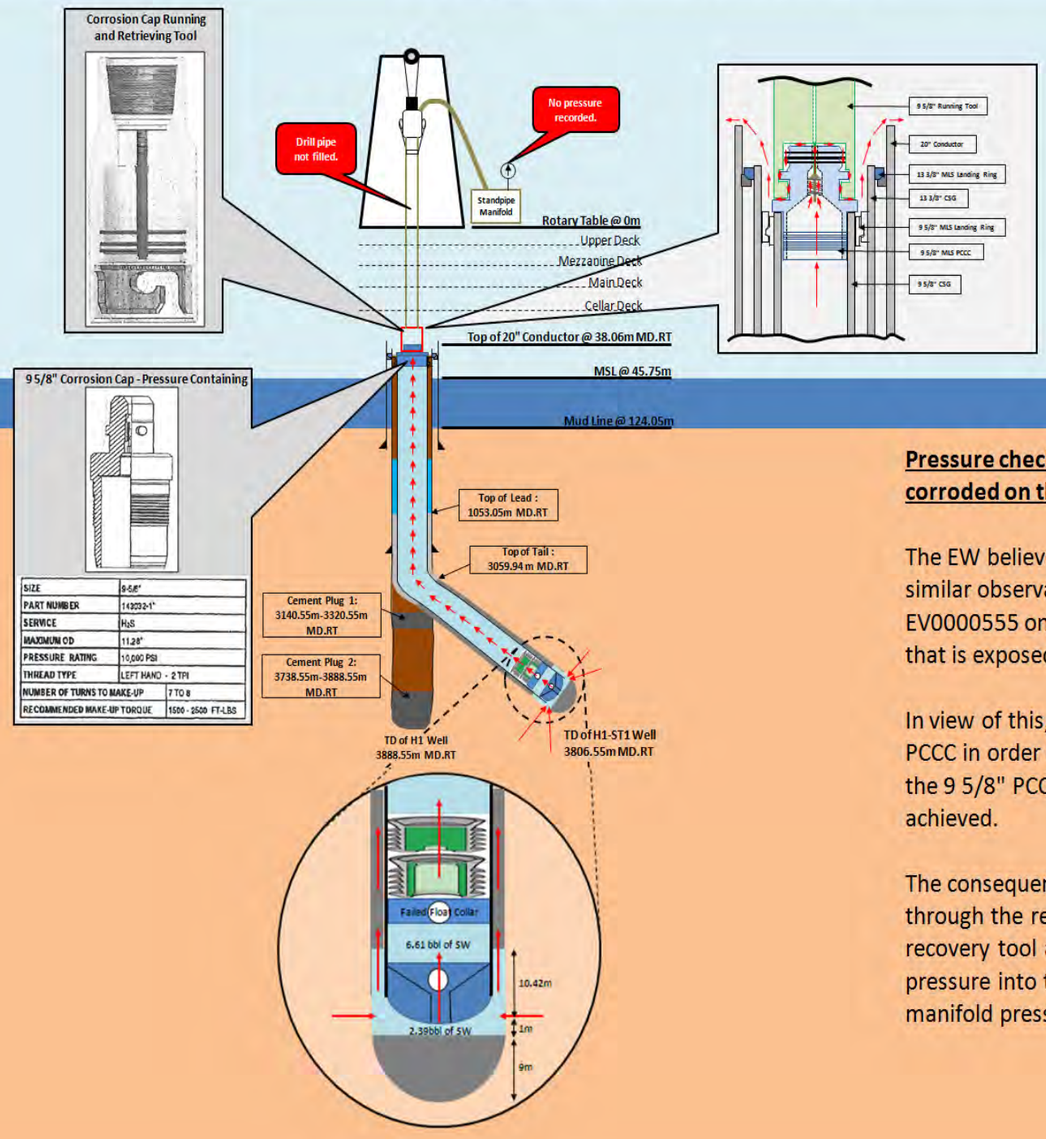
INVESTIGATION INTO THE UNCONTROLLED RELEASE OF HYDROCARBONS FROM THE MONTARA WELLHEAD PLATFORM ON THE 21 AUGUST 2009

EXPERT WITNESS REPORT

WAiT© #2 – Well Integrity Status of H1-ST1 from Re-Entry to Blowout

H1-ST1 9 5/8" PCCC Pressure Check: Scenario 3

20 August 2009, 1130 Hrs



Pressure check under 9 5/8" MLS PCCC (Assuming 9 5/8" MLS PCCC threads to be corroded on the outside)

The EW believes that a corroded external 9 5/8" MLS PCCC is a possible scenario due to a similar observation made on the 13 3/8" MLS threads (as referenced from H1-ST1 Well DDR EV0000555 on the 20 Aug 2009). This assumes that the exterior body of the 9 5/8" PCCC that is exposed to the marine environment is not corrosion resistant.

In view of this, when the 9 5/8" PCCC retrieval tool was run in and made up to the 9 5/8" PCCC in order to check for pressure below the 9 5/8" PCCC, a true hydraulic seal between the 9 5/8" PCCC and the elestomeric seal on the 9 5/8" retrieval tool may not have been achieved.

The consequence of this could have been that when the pressure relief valve was released through the recovery tool in the 9 5/8" PCCC, the compromised hydraulic seal between the recovery tool and the 9 5/8" PCCC initiated a leak path, thereby venting any small excess pressure into the atmosphere and preventing any observable pressure at the standpipe manifold pressure gauge.

3.2.3 WI Status of H1-ST1 - Removal of 9 5/8" MLS PCCC

SW ISO Doc Number:	XLS-30291-NOPSA-002
Prepared By:	Myo / Linus / Sean / Yeo Min
Reviewed By:	Colin Stuart
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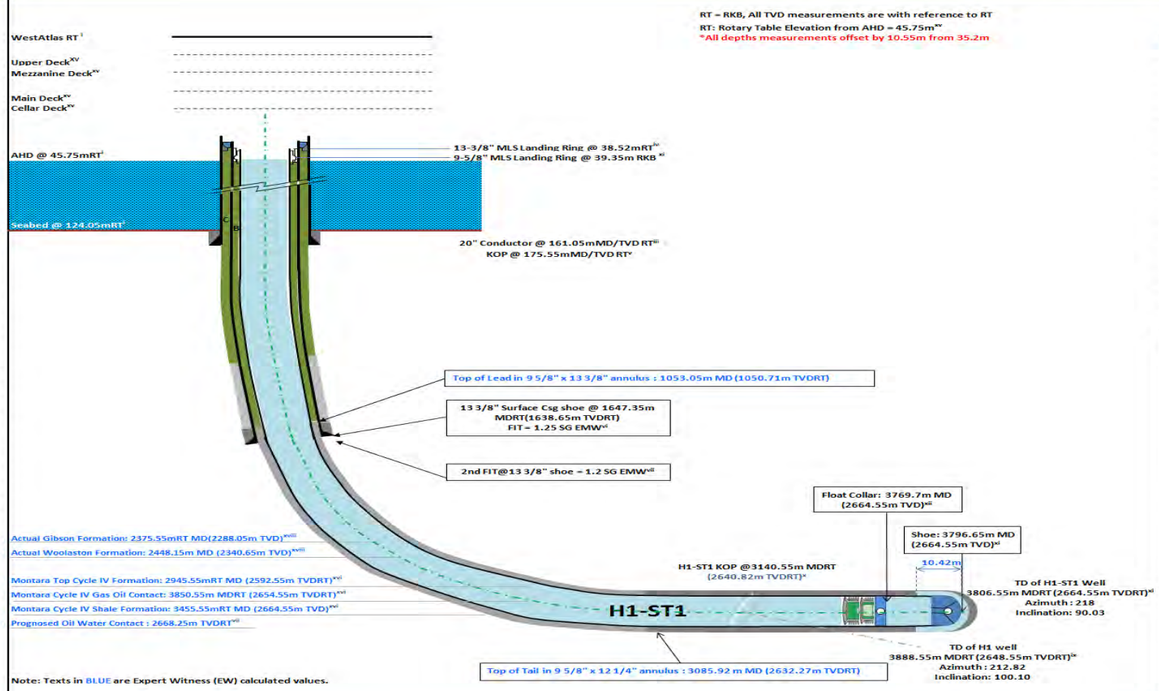
INVESTIGATION INTO THE UNCONTROLLED RELEASE OF HYDROCARBONS FROM THE MONTARA WELLHEAD PLATFORM ON THE 21 AUGUST 2009
EXPERT WITNESS REPORT
WAiT© #2 – Well Integrity Status of H1-ST1 from Re-Entry to Blowout

TVDRT (m) | **WI Status of H1-ST1 - Removal of 9 5/8" MLS PCCC[xiv] (Panel 3 of 5)** | **20 August 2009, 1130 Hrs[xiv]**



References		
#	NOPSA Doc No.	Description
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ii	EV0000614	GI, H1 & H4 (Batch Drilled) Drilling Program Rev 1
iii	EV0000529	Daily Drilling Report, H1 (#2)
iv	EV0000534	Daily Drilling Report, H1 (#7)
v	EV0000530	Daily Drilling Report, H1 (#3)
vi	EV0000536	Daily Drilling Report, H1 (#9)
vii	EV0000614	GI, H1 & H4 (Batch Drilled) Drilling Program Rev 2, Appendix 6 Directional Program.
viii	EV0000538	Daily Drilling Report, H1 (#11)
ix	EV0000543	Daily Drilling Report, H1 (#16)
x	EV0000546	Daily Drilling Report, H1-ST1 (#1)
xi	EV0000552	Daily Drilling Report, H1-ST1 (#7)
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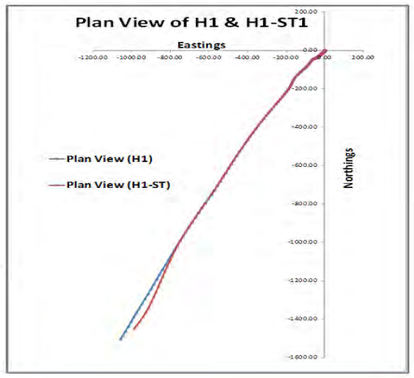
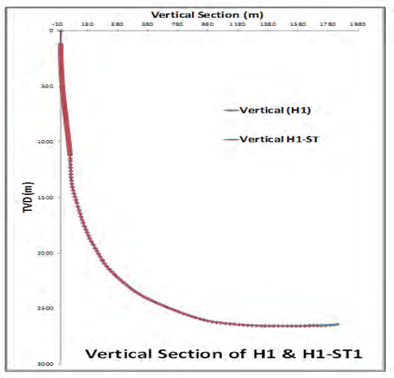
xiii	-	D41-502433-FACOOM, Rev 3
xiv	EV0000555	Daily Drilling Report, H1-ST1 (#12)
xv	EV0000051	Montara Phase 1B Drilling & Completion Program
xvi	DB-30291-NOPSA-404	PTTEP Document Submission - Regulatory Approvals#3
xvii	EV0000692	DDR Montara-H3-ST1 (03/04/09)
xviii	DB-30291-NOPSA-359	Actual TVD of formation tops for H1 ST1 , H4 and GI ST1

Legend	
	Description
C	Annulus Space between 20" conductor and 13 3/8" Csg
B	Annulus Space between 13 3/8" Csg and 9-5/8" Csg
KOP	Kick off point





WAiT© Well Integrity Analysis

"As Built" Well Facts

12-1/4" hole (9 5/8" Casing)

Extract from NOPSA Assumed facts verified by Expert Witness review of all documents:

111. Around 11.30 am, the 9 5/8 inch MLS PCCC was removed from the H1-ST1 Well after testing for any signs of pressure under the PCCC.

117. The PTTEPAA Well Construction Manager, the PTTEPAA Chief Operating Officer and PTTEPAA Senior Drilling Supervisor told NOPSA that they believed at this point in the re-entry operations there were two barriers within the 9 5/8 inch casing of the H1-ST1 Well. The first barrier was a cemented casing shoe track and the second was a full column of inhibited seawater, neither of which was proven, in accordance with PTTEP's Well Construction Standards.

118. PTTEPAA believed that the fluid in the well was inhibited seawater which would provide a hydrostatic pressure at the bottom of the well greater than the formation pressure outside the casing. If correct the fluid in the well would act as a barrier to prevent the flow of gas and oil from the formation.

Extract from H1-ST1 well DDR on the 20 Aug 2009 (EV0000555)

3) Stabbed onto 244mm (9 5/8") Vecto pressure containing corrosion cap at ~38m RT and ***observed no pressure increase at the standpipe.***

4) The corrosion cap was then removed from H1-ST1 and recovered through the rotary table.

Well Integrity Condition

Primary Well Barrier(s) with respect to Actual Montara Cycle IV Formation as per SECTION 9.8.1, NORSOK D-010 STANDARD, REV 3, AUGUST 2004

Element	Assessment	Traffic Light
1) 9 5/8" Casing	Pressure tested to 4000psi (2.76MPa) for 10 min, Good Test verifying the 9 5/8" Casing above the shoe track as a barrier.	
2) Cement Plug (Shoe Track)	1. Overdisplacement of 9bbl of seawater resulted in no cement within (6.61bbl) and around (2.39bbl) the 9 5/8" shoe. The EW has ASSUMED that 1m of the rat hole has been filled with seawater and the remaining volume of 1.9bbl shall displace the cement in the annulus, leaving 10.4m of reservoir with only a seawater column as the barrier against the Montara Cycle IV reservoir. 2. During the WOC period, post overdisplacement, surface pressure leaked from 1300 psi to 687 psi. This an indication that pressure was leaking off into the Montara Cycle IV formation through the "wet shoe", and is clear evidence that the 9 5/8" casing was in direct communication to the Montara Cycle IV reservoir, due to the compromised shoe track barrier. 3. Floats failed to hold the back pressure. Overdisplaced cement compromised shoe track (wet shoe). Incompetent barrier.	
3) Hydrostaric Column inside casing	0 to 73 psi underbalance to the Montara Cycle IV reservoir pressure ASSUMING a range of 1.04SG to 1.06 SG at top of Montara Cycle IV reservoir. This fluid column will not be considered as a competent well barrier according to Table 15.1 of the Norsok D-010 Standard that states: "The hydrostatic pressure shall at all times be equal to the estimated or measured pore/reservoir pressure, plus a defined safety margin".	
4) TOC (9-5/8" x 13-3/8")	Unverified TOC in annulus between 9-5/8" and 13-3/8" casings of H1-ST1 well. Unverified Barrier.	

Secondary Well Barrier(s) with respect to Actual Montara Cycle IV Formation as per SECTION 9.8.1, NORSOK D-010 STANDARD, REV 3, AUGUST 2004

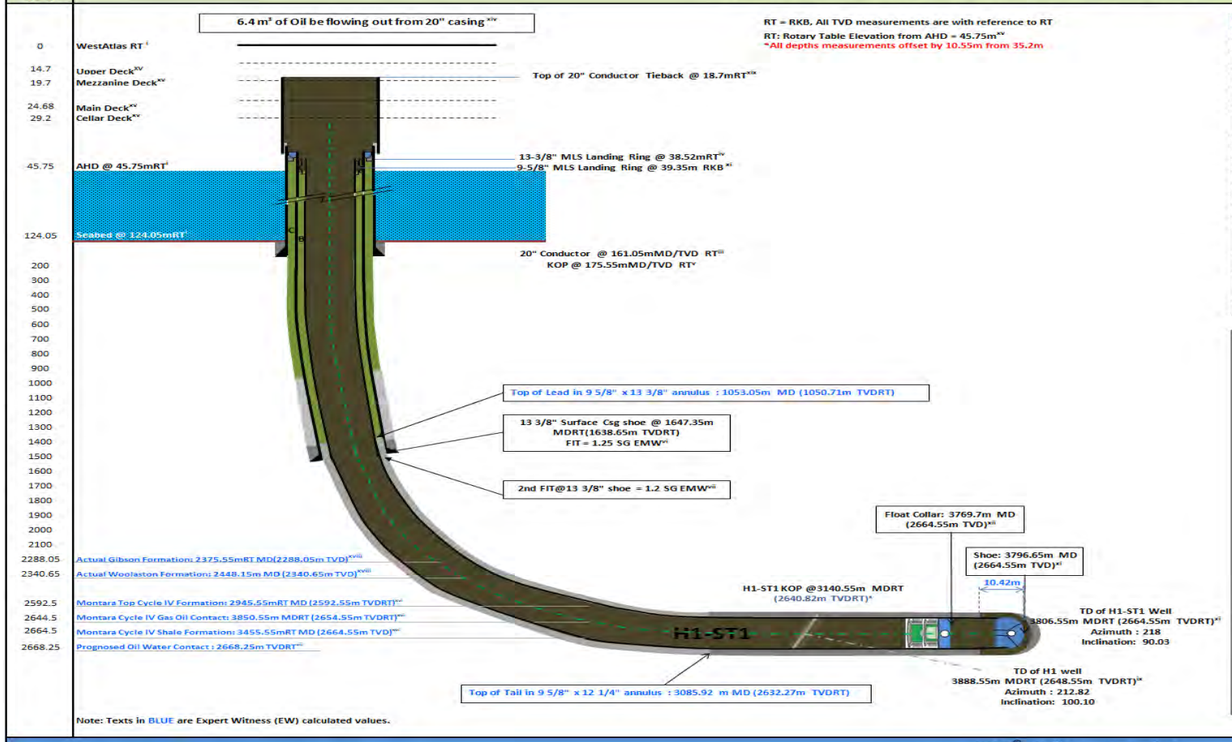
Element	Assessment	Traffic Light
1) Surface Cement Plug	Replaced with 9 5/8" PCCC as per WCCCF006, and therefore non-existent as a barrier. In the expert's opinion the surface cement plug should not have been removed from the suspension program since a PCCC is not a barrier(s) as defined by PTTEP well construction standard[xiii].	
2) 13 3/8" x 9 5/8" MLS Hanger	No pressure sealing capability, hence non-existent as a barrier to provide surface annular isolation.	
3) 13 3/8" PCCC	Was not installed, or even if installed, not qualified as a barrier as it was not pressure containing.	
4) BOP	The BOP was not a barrier because it was removed from the H1-ST1 Well and transferred to H3-ST1 on 3 Apr 09[xvii].	
5) 13-3/8" Casing	Pressure tested to 3,000psi (20,684 kPa) for 15 min. Good test verifying the 13-3/8" casings as a barrier.	

3.2.4 WI Status of H1-ST1 - Wellflow Observed

SW ISO Doc Number:	XLS-30291-NOPSA-002
Prepared By:	Myo / Linus / Sean / Yeo Min
Reviewed By:	Colin Stuart
Date:	16-Feb-12
Revision Number:	1

INVESTIGATION INTO THE UNCONTROLLED RELEASE OF HYDROCARBONS FROM THE MONTARA WELLHEAD PLATFORM ON THE 21 AUGUST 2009
EXPERT WITNESS REPORT
WAIT© #2 – Well Integrity Status of H1-ST1 from Re-Entry to Blowout

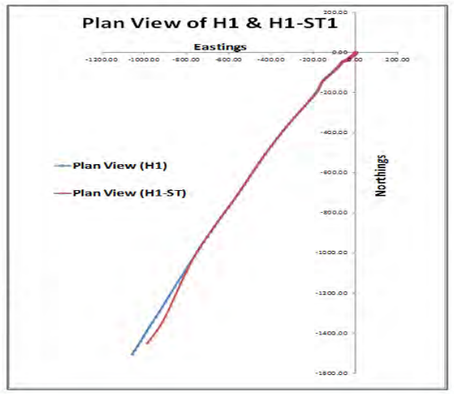
TVDRT (m) | **WI Status of H1-ST1 - Wellflow Observed (Panel 4 of 5)** | **21 August 2009, 0538 Hrs[xiv]**

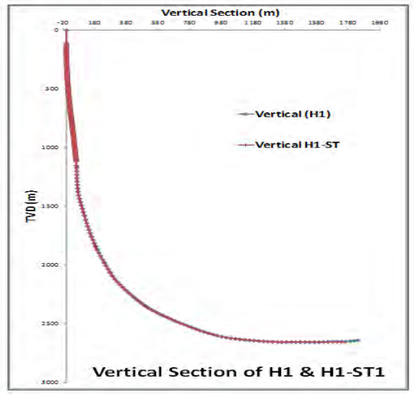


Note: Texts in BLUE are Expert Witness (EW) calculated values.

References		
#	NOPSA Doc No.	Description
i	EV0000530	Daily Drilling Report, H1 (#3)
ii	EV0000614	GI, H1 & H4 (Batch Drilled) Drilling Program Rev
iii	EV0000529	Daily Drilling Report, H1 (#2)
iv	EV0000534	Daily Drilling Report, H1 (#7)
v	EV0000530	Daily Drilling Report, H1 (#3)
vi	EV0000536	Daily Drilling Report, H1 (#9)
vii	EV0000614	GI, H1 & H4 (Batch Drilled) Drilling Program Rev 2, Appendix 6 Directional Program.
viii	EV0000538	Daily Drilling Report, H1 (#11)
ix	EV0000543	Daily Drilling Report, H1 (#16)
x	EV0000546	Daily Drilling Report, H1-ST1 (#1)
xi	EV0000552	Daily Drilling Report, H1-ST1 (#7)
xii	EV0000028	Cementing Calculations H-ST1, Rev-1
xiii	-	D41-502433-FACOOM, Rev 3
xiv	EV0000612	Daily Drilling Report, H4 (#22)
xv	EV0000051	Montara Phase 1B Drilling & Completion Program
xvi	DB-30291-NOPSA-404	PTTEP Document Submission - Regulatory Approvals#3
xvii	EV0000692	DDR Montara-H3-ST1 (03/04/09)
xviii	DB-30291-NOPSA-359	Actual TVD of formation tops for H1 ST1 , H4 and GI ST1
xix	EV0000555	Daily Drilling Report, H1-ST1 (#12)

Legend	
	Description
C	Annulus Space between 20" conductor and 13 3/8" Csg
B	Annulus Space between 13 3/8" Csg and 9-5/8" Csg
KOP	Kick off point





WAIT© Well Integrity Analysis

"As Built" Well Facts

12-1/4" hole (9 5/8" Casing)

Extract from NOPSA Assumed facts verified by Expert Witness review of all documents:

128. At about 5.38 am on Friday 21st August 2009 workers on the Montara WHP, engaged in tying back the H4 well, observed a quantity of liquid flowing from one of the Montara WHP wells. Initially they were not sure which well was flowing but they later identified it as the H1-ST1 Well.

134. About 5.55 am, the flow from the well subsided and the West Atlas OIM stood down all personnel from their muster stations.

Extract from H4 well DDR on the 21 Aug 2009 (EV0000612)

1) General alarm sounded at 0538hrs - all gatered at muster stations.
*2) **H1 ST-1 seem to 'burp' -6.4m³ of oil/oily water.** All hot work on West Atlas and Java Constructor prohibited and town informed of incident and oil spill.*

Well Integrity Condition

Primary Well Barrier(s) with respect to Actual Montara Cycle IV Formation as per SECTION 9.8.1, NORSOK D-010 STANDARD, REV 3, AUGUST 2004

Element	Assessment	Traffic Light
1) 9 5/8" Casing	Pressure tested to 4000psi (2.76MPa) for 10 min, Good Test verifying the 9 5/8" Casing above the shoe track as a barrier.	
2) Cement Plug (Shoe Track)	1. Overdisplacement of 9bbl of seawater resulted in no cement within (6.61bbl) and around (2.39bbl) the 9 5/8" shoe. The EW has ASSUMED that 1m of the rat hole has been filled with seawater and the remaining volume of 1.9bbl shall displace the cement in the annulus, leaving 10.4m of reservoir with only a seawater column as the barrier against the Montara Cycle IV reservoir. 2. During the WOC period, post overdisplacement, surface pressure leaked from 1300 psi to 687 psi. This an indication that pressure was leaking off into the Montara Cycle IV formation through the "wet shoe", and is clear evidence that the 9 5/8" casing was in direct communication to the Montara Cycle IV reservoir, due to the compromised shoe track barrier. 3. Floats failed to hold the back pressure. Overdisplaced cement compromised shoe track (wet shoe). Incompetent barrier.	
3) Hydrostaric Column inside casing	0 to 73 psi underbalance to the Montara Cycle IV reservoir pressure ASSUMING a range of 1.04SG to 1.06 SG at top of Montara Cycle IV reservoir. This fluid column will not be considered as a competent well barrier according to Table 15.1 of the Norsok D-010 Standard that states: "The hydrostatic pressure shall at all times be equal to the estimated or measured pore/reservoir pressure, plus a defined safety margin".	
4) TOC (9-5/8" x 13-3/8")	Unverified TOC in annulus between 9-5/8" and 13-3/8" casings of H1-ST1 well. Unverified Barrier.	

Secondary Well Barrier(s) with respect to Actual Montara Cycle IV Formation as per SECTION 9.8.1, NORSOK D-010 STANDARD, REV 3, AUGUST 2004

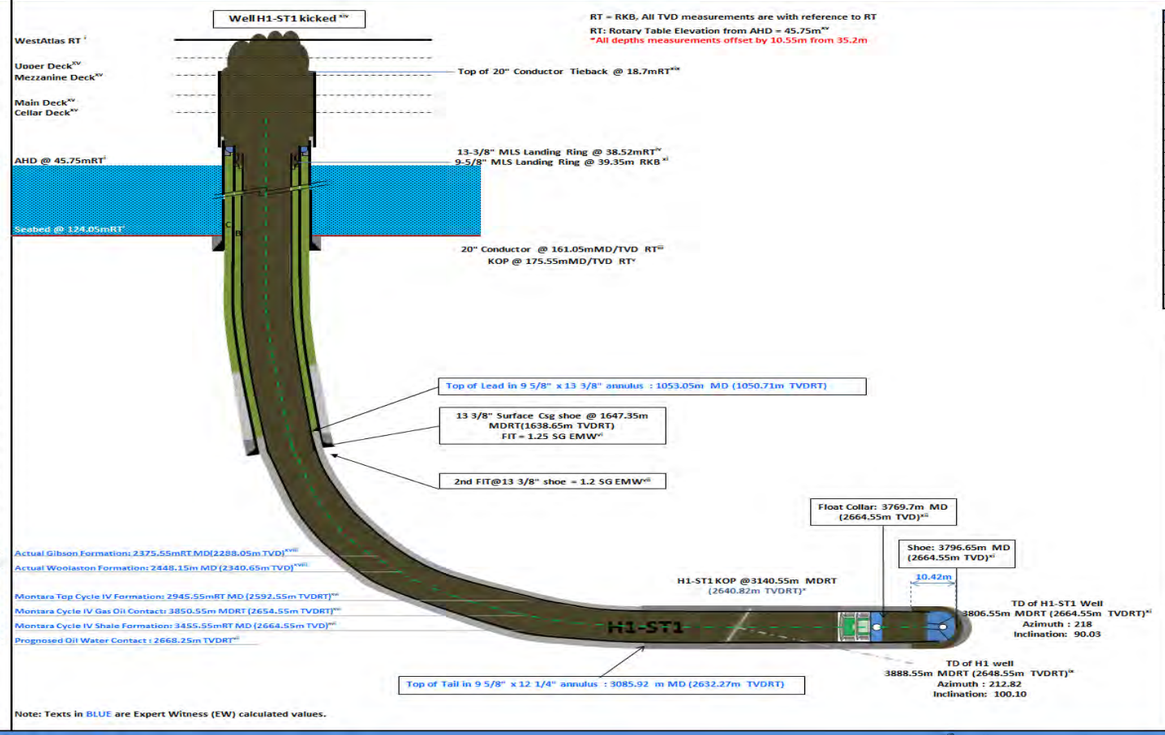
Element	Assessment	Traffic Light
1) Surface Cement Plug	Replaced with 9 5/8" PCCC as per WCCCF006, and therefore non-existent as a barrier. In the expert's opinion the surface cement plug should not have been removed from the suspension program since a PCCC is not a barrier(s) as defined by PTTEP well construction standard[xvi].	
2) 13 3/8" x 9 5/8" MLS Hanger	No pressure sealing capability, hence non-existent as a barrier to provide surface annular isolation.	
3) 13 3/8" PCCC	Was not installed, or even if installed, not qualified as a barrier as it was not pressure containing.	
4) BOP	The BOP was not a barrier because it was removed from the H1-ST1 Well and transferred to H3-ST1 on 3 Apr 09[xvii].	
5) 13-3/8" Casing	Pressure tested to 3,000psi (20,684 kPa) for 15 min. Good test verifying the 13-3/8" casings as a barrier.	

3.2.5 WI Status of H1-ST1 – Evacuation

SW ISO Doc Number:	XLS-30291-NOPSA-002
Prepared By:	Myo / Linus / Sean / Yeo Min
Reviewed By:	Colin Stuart
Date:	16-Feb-12
Revision Number:	1

INVESTIGATION INTO THE UNCONTROLLED RELEASE OF HYDROCARBONS FROM THE MONTARA WELLHEAD PLATFORM ON THE 21 AUGUST 2009
EXPERT WITNESS REPORT
WAiT© #2 – Well Integrity Status of H1-ST1 from Re-Entry to Blowout

TVDRT (m) | **WI Status of H1-ST1 - Evacuation (Panel 5 of 5)** | **21 August 2009, 0723 Hrs[xiv]**



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References		
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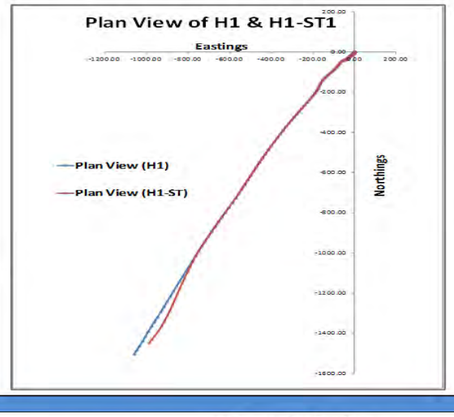
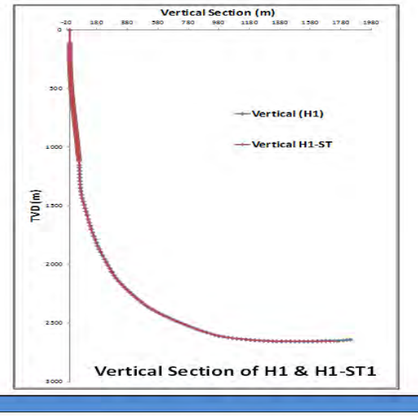
v	EV0000530	Daily Drilling Report, H1 (#3)
vi	EV0000536	Daily Drilling Report, H1 (#9)
vii	EV0000614	GI, H1 & H4 (Batch Drilled) Drilling Program Rev 2, Appendix 6 Directional Program.
viii	EV0000538	Daily Drilling Report, H1 (#11)
ix	EV0000543	Daily Drilling Report, H1 (#16)
x	EV0000546	Daily Drilling Report, H1-ST1 (#1)
xi	EV0000552	Daily Drilling Report, H1-ST1 (#7)
xii	EV0000028	Cementing Calculations H-ST1, Rev-1
xiii	-	D41-502433-FACOOM, Rev 3
xiv	EV0000612	Daily Drilling Report, H4 (#22)
xv	EV0000051	Montara Phase 1B Drilling & Completion Program
xvi	DB-30291-NOPSA-404	PTTEP Document Submission - Regulatory Approvals#3
xvii	EV0000692	DDR Montara-H3-ST1 (03/04/09)
xviii	DB-30291-NOPSA-359	Actual TVD of formation tops for H1 ST1 , H4 and GI ST1
xix	EV0000555	Daily Drilling Report, H1-ST1 (#12)

Legend	
	Description
C	Annulus Space between 20" conductor and 13 3/8" Csg
B	Annulus Space between 13 3/8" Csg and 9-5/8" Csg
KOP	Kick off point





WAiT© Well Integrity Analysis

"As Built" Well Facts

12-1/4" hole (9 5/8" Casing)

Extract from NOPSA Assumed facts verified by Expert Witness review of all documents:

138. About 7:23 am before skidding operations could commence the H1-ST1 Well started flowing again, with such force that a column of oil and gas was blowing into the underside of the West Atlas rig floor.

Extract from H4 well DDR on the 21 Aug 2009 (EV0000612)

1) General alarm sounded at 0723hrs - all gathered at muster station by 0730hrs.

*2) **H1-ST1 observed to be flowing - suspected leak in the 244mm (9 5/8") shoe track.***

3) OIM asked lifeboat 1 and 2 to be boarded by all non-essentials (leaving 17 personnel for lifeboat 3).

*4) **The gas cloud from the well-bay was seen to be spreading as flow from well increased.***

5) Rig Shut down at 0740hrs and emergency generator started automatically.
6) Lifeboats 1 and 2 launched at 0745hrs and proceed to the Lady Audrey standby vessel.

Well Integrity Condition

Primary Well Barrier(s) with respect to Actual Montara Cycle IV Formation as per SECTION 9.8.1, NORSOK D-010 STANDARD, REV 3, AUGUST 2004

Element	Assessment	Traffic Light
1) 9 5/8" Casing	Pressure tested to 4000psi (2.76MPa) for 10 min, Good Test verifying the 9 5/8" Casing above the shoe track as a barrier.	
2) Cement Plug (Shoe Track)	1. Overdisplacement of 9bbl of seawater resulted in no cement within (6.61bbl) and around (2.39bbl) the 9 5/8" shoe. The EW has ASSUMED that 1m of the rat hole has been filled with seawater and the remaining volume of 1.9bbl shall displace the cement in the annulus, leaving 10.4m of reservoir with only a seawater column as the barrier against the Montara Cycle IV reservoir. 2. During the WOC period, post overdisplacement, surface pressure leaked from 1300 psi to 687 psi. This an indication that pressure was leaking off into the Montara Cycle IV formation through the "wet shoe", and is clear evidence that the 9 5/8" casing was in direct communication to the Montara Cycle IV reservoir, due to the compromised shoe track barrier. 3. Floats failed to hold the back pressure. Overdisplaced cement compromised shoe track (wet shoe). Incompetent barrier.	
3) Hydrostaric Column inside casing	0 to 73 psi underbalance to the Montara Cycle IV reservoir pressure ASSUMING a range of 1.04SG to 1.06 SG at top of Montara Cycle IV reservoir. This fluid column will not be considered as a competent well barrier according to Table 15.1 of the Norsok D-010 Standard that states: "The hydrostatic pressure shall at all times be equal to the estimated or measured pore/reservoir pressure, plus a defined safety margin".	
4) TOC (9-5/8" x 13-3/8")	Unverified TOC in annulus between 9-5/8" and 13-3/8" casings of H1-ST1 well. Unverified Barrier.	

Secondary Well Barrier(s) with respect to Actual Montara Cycle IV Formation as per SECTION 9.8.1, NORSOK D-010 STANDARD, REV 3, AUGUST 2004

Element	Assessment	Traffic Light
1) Surface Cement Plug	Replaced with 9 5/8" PCCC as per WCCCF006, and therefore non-existent as a barrier. In the expert's opinion the surface cement plug should not have been removed from the suspension program since a PCCC is not a barrier(s) as defined by PTTEP well construction standard[xiii].	
2) 13 3/8" x 9 5/8" MLS Hanger	No pressure sealing capability, hence non-existent as a barrier to provide surface annular isolation.	
3) 13 3/8" PCCC	Was not installed, or even if installed, not qualified as a barrier as it was not pressure containing.	
4) BOP	The BOP was not a barrier because it was removed from the H1-ST1 Well and transferred to H3-ST1 on 3 Apr 09[xvi].	
5) 13-3/8" Casing	Pressure tested to 3,000psi (20,684 kPa) for 15 min. Good test verifying the 13-3/8" casings as a barrier.	

4. Additional Factors Considered by the Expert Witness after consideration of ALL documents, examination of "Assumed Facts" and after answering NOPSA's Nine (9) Issues

In addition to answering the nine (9) issues raised by NOPSA to the examination on the uncontrolled release of hydrocarbon from the Montara Jacket Platform on 21 August 2009, the Expert Witness had identified in his opinion, additional critical factors in relation to the investigation.

These additional critical factors are as follows:

- Comments and Opinions on PTTEPAA'S P&A and Suspension requirement - drawing comparison between PTTEPAA, CFR and NORSOK D-10 P&A requirement.
- Comments and Opinions on PTTEPAA and ATLAS Drilling Risk Assessment Methods employed.
- No Surface Isolation Barriers to Annular Flow in H1-ST1 9 5/8" (244mm) x 13 3/8" (340mm) annulus.
- Impact of the Mud Line Suspension System deployed by PTTEPAA on Well Risk.

4.1 Expert Witness's Comments and Opinion on PTTEPAA's P&A and Suspension Requirements

In this section, the status of the H1 and H1-ST1 Wells are highlighted, prior to the tie-back operations on the 19 August 2009, to determine the appropriate standards that construction methods for Wells H1 and H1-ST1 were required to comply with:

1. Status of the H1 Well, as defined in the PTTEPAA Well Construction Standards, ["EV0000096"], prior to the tie-back operations on the 19 August 2009[i]
2. Status of the H1-ST1 Well, as defined in the PTTEPAA Well Construction Standards, ["EV0000096"], prior to the tie-back operations on the 19 August 2009[ii]
3. Comparison between the PTTEPAA Well Construction Standards ["EV0000096"] against the CFR and NORSOK D-010 P&A and Suspension Requirements[iii]

Special Note[i]: According to the document 'Application for Approval to sidetrack Montara H1-AC-L7', ["EV0000020"], the following was stated by the NT "*Pursuant to Clause 17 (1) (a) of the Petroleum (Submerged Lands) Management of Well Operations) Regulations 2004, I hereby approve your application to sidetrack the well Montara – H1 in accordance with your submission sent by email and received by this office on 27 February 2009*". The H1 Well, according to PTTEPAA Well Construction Standards should have been permanently abandoned as described in Volume 1 of this report.

Special Note[ii]: Since the MODU did not remain on location following suspension on the H1-ST1 Well on 7 March 2009, the well according to PTTEPAA well construction standards could not have been in a Temporary Suspension state, but rather in '**Long Term Suspension**' as described in Volume 1 of this report.

Special Note[iii]: Refer to section 4.1.1.

4.1.1 Comparison between PTTEPAA against CFR and NORSOK D-010 P&A and Suspension Requirements

4.1.1.1 Barrier Philosophy

With reference to section 4.5 of Volume 1 of this report, PTTEPAA's barrier philosophy of maintaining two (2) proven barriers between hydrocarbon bearing zones and the surface is in accordance to the requirements of NORSOK D-010 and the CFR.

4.1.1.2 Barrier Acceptance Criteria

Barriers pertinent to those installed in the wellbores H1 and H1-ST1, and their respective acceptance criteria are discussed below.

Cement Plug in H1 Open Hole

PTTEPAA's barrier verification acceptance criteria as stated in their Well Construction Standard ["EV0000096"] for cement plugs in the open hole, had met similar requirements of NORSOK D-010 and the CFR through the following means:

- "*Tagging with sufficient force to confirm the top of good cement*
- *Tagging pressure must equal the equivalent of 3500KPa (500 psi)*
- *Or Pressure Testing to 7000 KPa (1000 psi) over leak off*".

As stated by NORSOK D-010 in Clause 15.24, cement plugs in open hole at a minimum shall be verified by means of:

- "*Tagging, or measure to confirm depth of firm plug*"

As stated in 30 CFR 250.174, BSEE states that the Operator must test the first plug below the surface plug and all plugs in lost circulation areas that are in open hole. The plug must pass one of the following tests to verify plug integrity:

- "*A pipe weight of at least 15,000 pounds on the plug; or*
- *A pump pressure of at least 1,000 pounds per square inch. Ensure that the pressure does not drop more than 10 percent in 15 minutes*".

9 5/8" (244mm) Casing Cement in H1-ST1

PTTEPAA's barrier verification acceptance criteria as stated in their Well Construction Standard [EV0000096] for casing cement, had met similar requirements of NORSOK D-010 as follows:

- "*Waiting until the surface cement (tail) samples are set, providing that the cement job proceeded normally and a clear pressure differential was observed prior to bumping the plug.*
- *The differential pressure must confirm that the TOC is a minimum of 50m above any hydrocarbon or over-pressured water zone*".

As stated in NORSOK D-010, Clause 15.22, casing cement at a minimum shall be verified by means of:

- **"*Casing through hydrocarbon bearing formations:*** *For cemented casing strings which are not drilled out, the height above a point of potential inflow/leakage point/ permeable formation with hydrocarbons, shall be 200m, or to previous casing shoe, whichever is less.*

- *The verification requirements for having obtained the minimum cement height shall be described, which can be:*
  a. *Verification by logs (cement bond, temperature, LWD sonic), or*
  b. *Estimation on the basis of records from the cement operation (volumes pumped, returns during cementing, etc)*
  c. *The strength development of the cement slurry shall be verified through observation of representative surface samples from the mixing cured under a representative temperature and pressure*".

Fluid Column within 9 5/8" (244mm) Casing in H1-ST1

According to page 37 of PTTEPAA's Well Construction Standard ["EV0000096"], a fluid column is not considered as a barrier for either long term suspension or abandonment. However, inter alia, NORSOK D-010 states that the fluid column can be accepted as a barrier provided the following minimum requirements are met:

- "*The hydrostatic pressure shall at all times be equal to the estimated or measured pore/reservoir pressure, plus a defined safety margin.*
- *Stable fluid level shall be verified.*
- *Critical fluid properties, including density shall be within specifications*".

9 5/8" (244mm) and 13 3/8" (340mm) Corrosion Caps in H1/H1-ST1

PTTEPAA's barrier verification acceptance criteria for corrosion caps, classified as "*All Other Barriers*" in page 13 of the Well Construction Standard ["EV0000096"], has **ONLY PARTIALLY** met the minimum requirements of NORSOK D-010 as follows:

- "*By either pressure testing or inflow testing*"

No acceptance criteria have been provided in the NORSOK D-010 Standard, Rev 3, 2004 for Corrosion Caps. However, as stated in **section 4.2.3.3 of the NORSOK D-010,** Well barrier acceptance criteria are technical and operational requirements that need to be fulfilled in order to qualify the well barrier or WBE for its intended use. Corrosion Caps can only qualify as a well barrier provided they are designed, selected and/or constructed such that:

1. "*it can withstand the maximum anticipated differential pressure it may become exposed to;*
2. *it can be leak tested and function tested or verified by other methods;*
3. *no single failure of well barrier or WBE leads to uncontrolled outflow from the borehole/ well to the external environment;*
4. *re-establishment of a lost well barrier or another alternative well barrier can be done;*
5. *it can operate competently and withstand the environment for which it may be exposed to over time;*
6. *its physical location and integrity status of the well barrier is known at all times when such monitoring is possible*".

4.2 Expert Witness's Comment and Opinion on PTTEPAA and Atlas Drilling Risk Assessment Methods

In the sections 4.2.1 to 4.2.3 that follows, a comparison of the Risk Assessment Methods as applied by both PTTEPAA and Atlas Drilling for the Montara Field Development are compared against known industry Risk Assessment standards like the ISO. Also highlighted are key deficiencies found within the Risk Assessment and Management defined process as applied by PTTEPAA for their Well Construction Management System, which can be seen as a root cause to the Montara H1-ST1 Well blowout event.

4.2.1 PTTEPAA Risk Assessment Methods for Facilities Construction and Installation, SIMOPS, and WHP Hookup and Pre-Commissioning

As elaborated in section 5.7.1 of the Volume 1 Report, the Coogee Resources HSEMS ["EV0000010"] follows a continuous improvement cycle, which links the specific elements of the HSEMS to the management system model approach provided in AS/NZS 4804:2001.

The Expert Witness has identified that the AS/NZS 4804:2001 share common management systems principles with **International (ISO)** environmental management systems Standards such as "***AS/NZS ISO 14001:1996, Environmental management systems— Specification with guidance for use and quality systems***", and Standards like "***AS/NZS ISO 9001:2000, Quality systems management— Requirements***".

4.2.2 PTTEPAA Risk Assessment Methods for Well Construction Management System

As elaborated in section 5.7.2 of Volume 1 Report, the risk assessment and management **Section 3.4 of ["EV0000050"]** states that PTTEPAA uses a "***defined process*** *to systematically identify the inherent risks involved in performing various activities*". **However, it should be highlighted that the "defined process" is not contained within the Well Construction Management Framework Standard ["EV0000050"] nor has it been located in any of the PTTEPAA documents submitted**. Therefore no-one involved in the Montara well

construction project could have followed the "*defined process to systematically identify the inherent risks involved in performing various activities*", since so far as the Expert can tell, it did not exist.

4.2.3 Atlas Drilling Risk Assessment Methods for Routine and Emergency Operations on Facility

As elaborated in section 5.7.3 of Volume 1 Report, the HAZID Risk Management technique is an endorsed method of the **ISO/FDIS 31000:2009** standard's definition and approach to Risk Assessment.

4.3 No Surface Isolation Barriers to Flow in H1-ST1 9 5/8" (244mm) x 13 3/8" (340mm) annulus

The H1-ST1 9 5/8" (244mm) by 13 3/8" (340mm) PCCC did not contain a pressure containing seal which is a standard barrier on casings at surface. It is speculated that this was left out at suspension by PTTEPAA since they would, after the tie-back of the 13 3/8" (340mm) casing to the production deck, install the final annular seal on the casing hanger. However, the time period that the H1-ST1 well contained no surface barrier on the annulus, exposed the well to annular flow risk, which would be considered unacceptable in any risk analysis under "Good Oilfield Practice". Therefore the following summary points apply to the annular flow risk potential during the suspension period of the H1-ST1 Well, and as illustrated on the WAiT© Chart in section 3.1.13 "WI Status of H1-ST1 at Stage 2 Suspension".

1. Lack of surface annular isolation (no containment) to **Montara Cycle IV** reservoir at time of suspension
   a. 9 5/8" (244mm) suspension casing hanger had no annulus seal
   b. Long term gas migration issue
   c. Risk of environmental spill
2. Insufficient tail volume coverage of reservoir
   a. The cement design and subsequent WCCCF ["EV0000800"] showed that PTTEPAA had intended the Tail slurry to cover the Montara Cycle IV reservoir. However, the physical volumes of cement pumped into the 9 5/8" (244mm) H1-ST1 Casing did not isolate the Montara Cycle IV reservoir.
3. Impact of the original hole H1 on H1-ST1 well integrity
   a. The WAiT© Chart in section 3.1.2 "WI Status of H1 well at Plug & Abandonment" shows that after the drilling out of the kick off plug, only 61m of cement plug #3 remained to isolate the entire volume of the H1 drilled reservoir from the H1-ST1 12 ¼" (311mm) x 9 5/8" (244mm) annulus. The significance of this is the tendency of gas to migrate into an annulus during cement hydration, due to loss of hydrostatic pressure. Since there is no evidence that the slurry had a short transition time, we can presume it did not. If this was the case, then the 61m of

remaining plug #3 (set at a hole angle of 82^0 inclination and exposed to drilling fluid) was likely in the Expert's opinion, not to have remained an intact barrier by the time of the 9 5/8" (244mm) casing cementation. The significance of this is that there were additional reasons why the tail volume of cement was critical in height and gas flow inhibition properties.

4.3.1 Risk of Annular Flow

The WAiT© Chart in section 3.1.13 "WI Status of H1-ST1 at Stage 2 Suspension" shows the Well Integrity Status at the time of suspension. In terms of surface barriers, it is an essential feature of all wells that the wellhead cavity between casings (the annular space) is sealed by a tested barrier. This barrier is a seal (either elastomeric or metal to metal or often both), which is either an integral part of each casing hanger, or can be installed immediately following cementation as a separate item. In the case of the H1-ST1 well, no such annular seal was installed on the MLS 9 5/8" (244mm) casing hanger, nor was a seal installed post cementation. PTTEPAA had in fact planned not to install an annular seal and were relying, according to MOC statements, on the intention to pump sufficient cement on the 9 5/8" (244mm) casing to have a TOC well inside the 13 3/8" (340mm) shoe.

Above the TOC, a fluid hydrostatic barrier did exist, but it is a known phenomena that drilling fluid left in annuli often will degrade in density to the base fluid over time, thereby losing its effectiveness as a barrier. The prevalence of SCP in the vast majority of wells is partially attributable to this fluid degradation problem. This meant that should the cement barrier fail at any time or have developed a channel during cementation, then effectively there was no secondary barrier to an uncontrolled reservoir flow from the annulus. This exposure existed from the end of H1-ST1 9 5/8" (244mm) cementing operation to the time of the blowout. The hydrocarbon source could have been the Montara Cycle IV sands or the identified gas sands in the Gibson and Woolaston formations.

Since PTTEPAA was conducting a highly unusual mudline suspension, by suspending the well at the mezzanine deck, the well had a short distance to the production deck; it is possible that the temporary MLS design could not have accommodated a casing hanger seal. If this

was the case, this should have eliminated the MLS option in a full risk assessment, unless a removable temporary seal, to facilitate the tie-back was installed at the time of suspension.

4.4 Impact of the Mud Line Suspension System on Well Risk

A MLS is designed to facilitate the temporary or permanent (subsea producer) suspension of a well below the seabed where a drilling rig has to move off location, leaving no/minimal obstruction above the seabed. The MLS is essentially a casing hanger system with integral seals to isolate the annuli, within which all casing strings are contained, suspended and terminated at the MLS.

Each of the casing hangers within the MLS contains a connection thread(s) which allow each casing string to be reconnected to the surface following return of the drilling rig. Therefore a well can be pre-drilled and suspended prior to a jacket/top side being installed, under certain water depth restrictions.

Normally, when the well is suspended in the MLS, below the seabed, PCCCs are a required part of the suspension barriers. Below the PCCCs the suspension barriers will include cement plugs and mechanical barrier devices, the number and type of which will depend on whether the well has been perforated into hydrocarbons, and the configuration of the casings.

When the drilling rig returns to the well location for a well re-entry, good oil field practice would dictate that a surface tested barrier i.e. riser and BOPs, would be installed on the well prior to checking for pressure and the subsequent removal of the PCCCs. The PCCCs have back pressure valves (BPV) contained within the body, the function of which is to allow a check of pressure below the PCCC under the above stated control conditions, i.e. riser and BOPs installed, prior to the actual removal of the PCCCs. In this manner, the integrity of the barriers set within the wellbore below the PCCC, is established. Should any pressure be detected below the BPV, this would indicate barrier integrity failure in the wellbore below the PCCC.

Good oilfield practice would be to conduct a thorough Risk Assessment prior to a well re-entry which would have identified the risk of trapped gas presence below the PCCCs due to well barriers integrity failure.

PTTEPAA did in fact identify the risk of "*gas below the TA cap*" (PCCC) in (Volume 2, Table 34, Assessment of Document [3] Montara Phase 1B-Drilling & Completion Program).

The consequence of gas below the TA cap was correctly identified by PTTEPAA as "*Gas to surface without BOPs in place*" (Section 7 of Document [3], Pg 198).

However, the PTTEPAA's mitigation (Section 7 of Document [3], Pg 198) to detected pressure below the PCCC, was to "*bleed off any pressure below the cap before removing the cap*".

In the circumstances of well H1-ST1, at this state of suspension it was a fact that **no approved wellbore barriers existed to the hydrocarbon reservoir** (Refer to section 3.2.2 "WI Status of H1-ST1 - Pressure Check Below 9 5/8" MLS PCCC").

Therefore, given that there were no wellbore barriers to the hydrocarbon reservoir below the PCCC, **a proper risk assessment would have resulted in the conclusion**, **that any pressure detected below the PCCC would likely indicate communication with the reservoir.**

PTTEPAA's planned control measure, "*bleed off any pressure*" to the evidence of gas below the PCCC was in fact not a control but a **risk escalation factor** by potentially increasing the drawdown to the hydrocarbon bearing reservoir by the volume of the trapped pressure.

In the re-entry (Section 7 of Document [3], Pg 198) procedure, PTTEPAA in addition identified "gas below the cement plug" as a hazard with the consequences of well kick and well control problem, the prevention/mitigation to this hazard was as follows:

"*BOPs will be installed prior to drilling out the cement plugs. Kill weight brine will be used to drill out the cement plug. After drilling out each plug the well will be flow checked and then circulate clean".*

In fact, the intention to set a surface cement plug in the suspension program was reversed as part of PTTEPAA WCCCF ["EV0000802"].

The seawater fluid column barrier within the 9 5/8" (244mm) casing could not be considered a barrier as per PTTEPAA's own barrier policy (Volume 2, Table 33, Assessment of Document [3] PTTEP Australasia-Well Construction Standards) under the conditions of "Long Term Suspension".

Furthermore, the seawater column in fact gave a -73 psi drawdown to the top of the Montara Cycle IV reservoir (WAiT© Chart in section 3.1.13 "WI Status of H1-ST1 at Stage 2 Suspension"), as calculated based on the documentation provided. The only barrier(s) in the H1-ST1 well to uncontrolled flow from the Montara Cycle IV reservoir from the time of bleeding off the pressure after the failed floats, was in fact the 9 5/8" (244mm) PCCC. There were no cement plugs inside the 9 5/8" (244mm) casing.

API 65-2 "Isolating Potential Flow Zones During Well Construction" states:

"The barrier design should incorporate the following elements:

1. *ability to withstand the maximum anticipated wellbore pressure,*
2. *ability to be tested for function and leaks,*
3. *failure of a single barrier will not result in uncontrolled flow from the well,*
4. *the operating environment is within the design specifications of the barrier element."*

It could be argued reasonably that the 9 5/8" (244mm) PCCC did not meet the API 65-2 definition of a barrier. In addition the 9 5/8" (244mm) PCCC, though rated for 10,000psi, was not tested after installation, to confirm if it had pressure integrity. Although not easy to accomplish, in normal circumstances with a tested casing below, such a test is possible. In PTTEPAA's case, pressure testing the well below the PCCC in order to test the threads and BPV integrity, would likely have been impossible due to the failed shoe track (Wet Shoe), and this may the reason why it was not attempted. **The result however was that a device not considered a barrier nor tested and verified, was installed on the H1-ST1 well, with no other accepted barrier between this device and the Montara Cycle IV reservoir.**

Given all of the above, the correct approach to the potential hazard gas below the 9 5/8" (240mm) PCCC, would have been to assume the 9 5/8" (240mm) PCCC was in effect

equivalent to a cement barrier from a Risk Perspective, and the PTTEPAA's planned prevention/mitigation for "gas below cement plug" should have been applied in this case.

Under these circumstances, a kill weight fluid would be available on the rig and BOPs would have been installed prior to stinging into the TA cap. In terms of options under such conditions to the evidence of "gas below the TA cap", PTTEPAA could have made available contingency milling equipment, to remove the TA cap in controlled conditions, and also considered the use of a rotating BOP to facilitate this operation under pressure. The Expert Witness has experience in re-entry contingency planning under this exact scenario.

DDR ["EV0000555"], dated 20 August 2009, describes the actions by PTTEPAA and SEADRILL offshore staff, during the operation to remove the 9 5/8" (240mm) PCCC. The document states that the 9 5/8" (240mm) PCCC retrieval tool was stung into the PCCC, and no pressure detected on the Standpipe manifold. This statement of zero pressure may be correct, however, subsequent events leading to the blowout of H1-ST1 would indicate that either:

1. The statement of zero pressure was incorrect due to equipment/instrument error or other reasons.
2. There was pressure below the 9 5/8" (240mm) PCCC, but it was undetectable at surface, by the crew.

For point 2 to be correct, several scenarios could support this:

1. The drill pipe on which the 9 5/8" (244mm) PCCC was run to the mezzanine deck, and was not filled with fluid; OR
2. There was a seal leak on the recovery tool; OR
3. The seawater column above the 9 5/8" (244mm) PCCC retrieval tool provided additional hydrostatic pressure to the H1-ST1 wellbore thus obscuring a small under balance pressure at surface.

The explanation for these plausible scenarios and their effect on a surface pressure gauge is explained in (WAiT© Charts in section 3.2.2.1 "H1-ST1 9 5/8" PCCC Pressure Check: Scenario 1" to section 3.2.2.3 "H1-ST1 9 5/8" PCCC Pressure Check: Scenario 3").

Summarizing Section 4.4, given the fact of the blowout caused by the well being under-balanced to the reservoir, it is entirely plausible that there was pressure below the 9 5/8" (244mm) PCCC, which was not detected at surface.

In all probability the seal leak on the recovery tool was the cause of any pressure below the PCCC being released to the atmosphere via the 20" (508mm) cut off casing undetected (section 3.2.2 "WI Status of H1-ST1 - Pressure Check Below 9 5/8" MLS PCCC"). As indicated in (section 3.2.2 "WI Status of H1-ST1 - Pressure Check Below 9 5/8" MLS PCCC"), the amount of under balance to the reservoir at the time of potential release of any pressure and recovery of the 9 5/8" (240mm) PCCC, was extremely small (73 psi).

Nonetheless, the well at this stage could have been feeding incremental but small volumes of hydrocarbon (oil) into the wellbore via the open 9 5/8" (244mm) shoe. It would have taken some time, for sufficient volume of hydrocarbon, to enter the wellbore and travel along the horizontal section above the shoe, before a significant flow and or gas bubble was detected, at surface. This duration is a function of rate of influx, reservoir properties, hydrocarbon fluid properties, and bubble point none of which information is really known.

In reality, the DDR ["EV0000612"] states that first detected signs of flow from the well occurred at 0538 am on 21 August 2009 (17.5 hours after the 9 5/8" (244mm) PCCC was removed).

It should also be pointed out that during this entire time, no monitoring of the fluid level in H1-ST1 well was stated by PTTEPAA to be in force and in fact the full attention of the rig crew was on the next well to which the rig had skidded at 0500 pm on 20 August 2009. It is likely in our opinion that the well was flowing small volumes of seawater over the 20" (508mm) stub for some time prior to it being detected by which time gas had evolved (at approximately 2,400m of depth) due to the bubble point being reached, from the oil column travelling up the wellbore, causing an increase in the upward velocity of hydrocarbons. It was gas emissions ("burp") from the well (PTTEP DDR H4 #22 ["EV0000612"]) that was first detected but this means that the oil column influx was already close to surface.

5. Cementing Calculation

The expert has provided a series of cementing calculations and graphs used in the analysis of the H1-ST1 9 5/8" (244mm) cementing operation, and a verification of PTTEPAA's Pre Cementing Calculations as per Coogee Resources Cementing Calculations and Reporting Form Revision 2 ["EV0000028"]. In addition, bottom hole pressure calculations at key stages of the Well Construction, are provided in support of the information presented in "**WAiT © #1 – Well Integrity Status of H1/H1-ST1 from TD 12 ¼" to Stage 2 Suspension**", and "**WAiT © #2 – Well Integrity Status of H1-ST1 from Re-Entry to Blowout**".

The Expert's verification of PTTEPAA's Pre Cementing Calculations is provided as follows:

1. Expert Witness Verification of Pre Cementing Calculations as per Coogee Resources Cementing Calculations and Reporting Form Revision 2 (EV0000028)

The 9 5/8" (244mm) H1-ST1 Casing Cement calculations are provided as follows:

1. Pseudo Static Equivalent Annulus BHP while Circulating 110% Casing Volume
2. Pseudo Static Equivalent Annulus BHP while Circulating 80bbl Spacer below Float Collar
3. Pseudo Static Equivalent Annulus BHP while Circulating 5bbl DW below Float Collar
4. Pseudo Static Equivalent Annulus BHP while Circulating LEAD Slurry below Float Collar
5. Pseudo Static Equivalent Annulus BHP while Circulating TAIL Slurry below Float Collar
6. Pseudo Static Equivalent Annulus BHP while Pressure Test to 4000psi after Plug Bump
7. Pseudo Static Equivalent Annulus BHP after Casing Pressure Test - 9 bbl Bleed Off
8. Pseudo Static Equivalent Annulus BHP Post Casing Pressure Test – Pressure spike to 1300psi observed.
9. Pseudo Static Equivalent Annulus BHP Post Pressure Spike to 1300psi
10. Pseudo Static Equivalent Annulus BHP Post 16bbl Overdisplacement
11. Pseudo Static Equivalent Annulus BHP, Post Overdisplacement, Wait on Cement Period
12. Pseudo Static Equivalent Annulus BHP after Installation of 9 5/8" PCCC

Pseudo static equivalent pressure is a term used to describe the calculation of bottom hole pressure performed by the Expert Witness at specific points in time. Use of the term pseudo merely illustrates that the value of BHP thus calculated is an estimate and not a direct measurement, or extract from any NOPSA provided documentation.

Also provided are two (2) graphs depicting bottom hole pressure changes against the Montara Cycle IV Pore Pressure, and Fracture Gradient Boundaries for the above twelve (12) 9 5/8" (244mm) H1-ST1 cementing phases:

1. Pseudo Static Equivalent Annulus BHP (Phase 1 to 5)
2. Pseudo Static Equivalent Annulus BHP (Phase 6 to 12)

5.1 Expert Witness Verification of Pre Cementing Calculations as per Coogee Resources Cementing Calculations and Reporting Form Revision 2 (EV0000028)

SW ISO Doc Ref No:	XLS-30291-NOPSA-003- 9 5/8 "Pre Cmtg Calcs
Prepared by:	MYO KYAW THU/ LINUS LIM/ SEAN FOO
Reviewed & Approved by:	COLIN STUART
Date:	16-Feb-12
Rev No:	1

Expert Witness Verification of Pre Cementing Calculations as per Coogee Resources Cementing Calculations and Reporting Form Revision 2 (EV0000028)

EW Verified Input Data from DDR

Well Data

RT	35.20	m
Water Depth	78.30	m
Top Wellhead	16.80	m
Mudline	113.50	m
Previous Casing Shoe	1636.80	m
Hole Size	12.25	in
Section TD	3796.00	m

Casing Data

Casing Shoe At	3786.07	m
Casing Shoe ID	8.78	in
Float Collar At	3759.15	m
Casing 1 Length	3759.15	m
Casing 1 OD	9.63	in
Casing 1 ID	8.78	in
Casing 2 Length	0.00	m
Casing 2 OD	0.00	in
Casing 2 ID	0.00	in
Casing 3 Length	0.00	m
Casing 3 OD	0.00	in
Casing 3 ID	0.00	in
Previous Casing OD	13.38	in
Previous Casing ID	12.46	in
Previous Hole size below previous shoe	17.50	in

Running String Data

Running String 1 Length	1.84	m
Running String 1 ID	8.78	in
Running String 2 Length	0.00	m
Running String 2 ID	0.00	in
Stick-up above RT	1.84	m
Stinger Length	0.00	m
Stinger ID	0.00	in

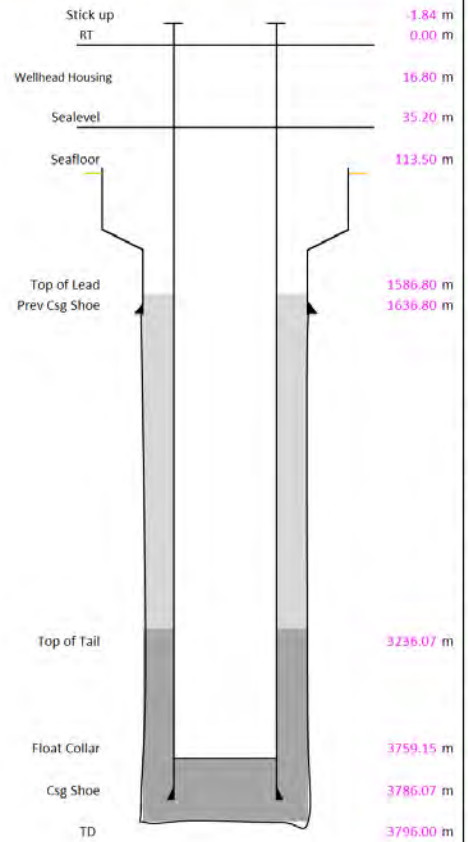
Cement Data

Length of Lead in cased hole	50.00	m
Length of Lead in 17 1/2" cased hole	7.20	m
Length of Lead in OH	1599.27	m
Length of Tail	550.00	m

Notes and Assumptions

Texts in BLACK: EW verified input data as per EV0000028.
Texts in Red: For further details, refer to Table 3 in Vol 2 of the the Expert Witness Report
Texts in Pink: EW calculated data.

EW Verified Schematic



EW Calculated Values

Cement Calculations

Capacities	bbls/ft	bbls/m
Running String 1	0.07489	0.24569
Running String 2	Nil	Nil
Stinger	Nil	Nil
Casing 1	0.07489	0.24569
Casing 2	Nil	Nil
Casing 3	Nil	Nil
13 3/8" Casing x 9 5/8" Casing	0.06082	0.19955
12 1/4" OH x 9 5/8" Casing	0.05578	0.18301
17 1/2" OH x 9 5/8" Casing	0.20751	0.68080
Rathole	0.14578	0.47827

Lead Slurry		bbls	ft³
Inside Casing x Casing Annulus		9.98	56.02
17 1/2" OH x 9 5/8" Casing Annulus	25%	6.13	34.40
12 1/4" OH x 9 5/8" Casing Annulus		292.68	1643.31
12 1/4" OH Excess	25%	73.17	410.83
	TOTAL	381.96	2144.56

Tail Slurry		bbls	ft³
Rathole		4.75	26.66
Shoe Track		6.61	37.14
OH x Casing Annulus		100.66	565.14
OH Excess	25%	25.16	141.29
	TOTAL	137.18	770.23

Cement Properties	tonnes
Volume of cement required Lead	37.34
Volume of cement required Tail	27.86
TOTAL	65.21

		Input		Volumes		
		Lead	Tail	Lead	Tail	
Yield	ft³/sx	2.41	1.16	889.86	663.99	sx
Mix Water	gal/sx	12.68	4.76	268.65	75.25	bbls
NF-7	gal/sx	0.009	0.003	8.01	1.99	gal
Gascon 470	gal/sx	1.2	0.1	1067.83	66.40	gal
SCR-100L	gal/sx	0.104	0.062	92.55	41.17	gal
Halad-413L	gal/sx	0.518	0.246	460.95	163.34	gal

Displacement	bbls
Surface Lines	0.00
Running String	0.45
Stinger	0.00
Casing ID 1	923.59
Casing ID 2	0.00
Casing ID 3	0.00
TOTAL	924.04

Spacer
Volume of Spacer to be pump 80 bbls

5.2 Pseudo Static Equivalent Annulus BHP while Circulating 110% Casing Volume

SW ISO Doc Ref No:	XLS-30291-NOPSA-003-9 5/8" Cmt Calcs 1
Prepared by:	SEAN FOO / YEO MIN
Reviewed & Approved by:	COLIN STUART
Date:	16-Feb-12
Rev No:	1

H1-ST1 well, 9 5/8" CSG, Pseudo Static Equivalent Annulus BHP while Circulating 110% Casing Volume

EW Verified Input Data from DDR

Well Data

RT	35.20	m
Water Depth	78.30	m
Top Wellhead	16.80	m
Mudline	113.50	m
Previous Casing Shoe	1636.80	m
Hole Size	12.25	in
Section TD	3796.00	m

Casing Data

Casing Shoe At	3786.07	m
Casing Shoe ID	8.78	in
Float Collar At	3759.15	m
Casing 1 Length	3759.15	m
Casing 1 OD	9.63	in
Casing 1 ID	8.78	in
Casing 2 Length	0.00	m
Casing 2 OD	0.00	in
Casing 2 ID	0.00	in
Casing 3 Length	0.00	m
Casing 3 OD	0.00	in
Casing 3 ID	0.00	in
Previous Casing OD	13.38	in
Previous Casing ID	12.46	in
Previous Hole size below previous shoe	17.50	in

Running String Data

Running String 1 Length	1.84	m
Running String 1 ID	8.78	in
Running String 2 Length	0.00	m
Running String 2 ID	0.00	in
Stick-up above RT	1.84	m
Stinger Length	0.00	m
Stinger ID	0.00	in

Cement Data

Length of Lead in cased hole	50.00	m
Length of Lead in 17 1/2" cased hole	7.20	m
Length of Lead in OH	1599.27	m
Length of Tail	550.00	m

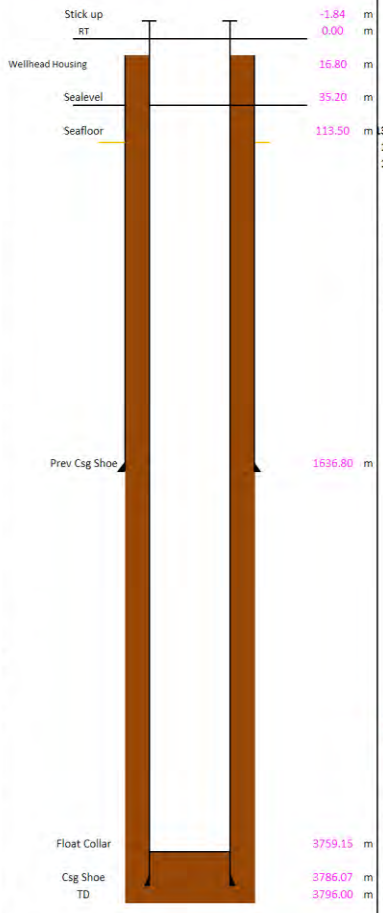
Notes and Assumptions

Texts in BLACK: EW verified input data as per EV0000028.
Texts in RED: For further details, refer to Table 3 in Vol 2 of the the Expert Witness Response to NOSPA Issues 1 to 9 - Montara H1-ST1 Blowout.
Texts in PINK: EW calculated data.

No losses have been assumed for these calculations as reported in the Daily Mud Reported dated 07/03/09 "EV0000034".

The EW has assumed a 0% hole excess for the 12 1/4" Open hole, based on the calculations used to achieve the reported cementing differential pressure of 1200 psi as stated in NOPSA's "Assumed Facts".

EW Verified Schematic



EW Calculated Values

Cement Calculations

Capacities	bbls/ft	bbls/m
Running String 1	0.075	0.246
Running String 2	Nil	Nil
Stinger	Nil	Nil
Casing 1	0.075	0.246
Casing 2	Nil	Nil
Casing 3	Nil	Nil
13 3/8" Casing x 9 5/8" Casing	0.061	0.200
12 1/4" OH x 9 5/8" Casing	0.056	0.183
17 1/2" OH x 9 5/8" Casing	0.208	0.681
Rathole	0.146	0.478

Open Hole Excess	0%

Phase 1: Full Mud Column in Annulus

	bbl	MD height in annulus (m)	Start MD (m)	End MD (m)	Start TVD (m)	End TVD (m)	TVD height (m)
Mud Vol Pumped	731.33	3796.00	3796.00	0.00	2653.00	0.00	2653.00

Annulus BHP @ TD due to Fluid Column

Fluid	Fluid Density (ppg)	Pressure Gradient (psi/ft)	Hydrostatic Pressure of fluid Column (psi)
Mud	9.6	0.499	4345.283
Total Pressure (psi)			4345

Cementing Calculation Worksheet Description

This worksheet presents the calculation of the static Bottom Hole Pressure (BHP) at the FINAL WELL DEPTH after circulating 110% of the 9 5/8" casing volume with 9.6 ppg Drilling Fluid.
This worksheet is the first (1st)of twelve (12) worksheets, and provides an appreciation of how the BHPs varies throughout the different stages of the H1-ST1 9 5/8" (244mm) cementing operations in the annulus due to the displacement of different fluid column(s).

5.3 Pseudo Static Equivalent Annulus BHP while Circulating 80bbl Spacer below Float Collar

SW ISO Doc Ref No:	XLS-30291-NOPSA-003-9 5/8" Cmt Calcs 2
Prepared by:	SEAN FOO / YEO MIN
Reviewed & Approved by:	COLIN STUART
Date:	16-Feb-12
Rev No:	1

H1-ST1 well, 9 5/8" CSG, Pseudo Static Equivalent Annulus BHP while Circulating 80bbl Spacer below Float Collar

EW Verified Input Data from DDR

Well Data

RT	35.20	m
Water Depth	78.30	m
Top Wellhead	16.80	m
Mudline	113.50	m
Previous Casing Shoe	1636.80	m
Hole Size	12.25	in
Section TD	3796.00	m

Casing Data

Casing Shoe At	3786.07	m
Casing Shoe ID	8.78	in
Float Collar At	3759.15	m
Casing 1 Length	3759.15	m
Casing 1 OD	9.63	in
Casing 1 ID	8.78	in
Casing 2 Length	0.00	m
Casing 2 OD	0.00	in
Casing 2 ID	0.00	in
Casing 3 Length	0.00	m
Casing 3 OD	0.00	in
Casing 3 ID	0.00	in
Previous Casing OD	13.38	in
Previous Casing ID	12.46	in
Previous Hole size below previous shoe	17.50	in

Running String Data

Running String 1 Length	1.84	m
Running String 1 ID	8.78	in
Running String 2 Length	0.00	m
Running String 2 ID	0.00	in
Stick-up above RT	1.84	m
Stinger Length	0.00	m
Stinger ID	0.00	in

Cement Data

Length of Lead in cased hole	50.00	m
Length of Lead in 17 1/2" cased hole	7.20	m
Length of Lead in OH	1599.27	m
Length of Tail	550.00	m

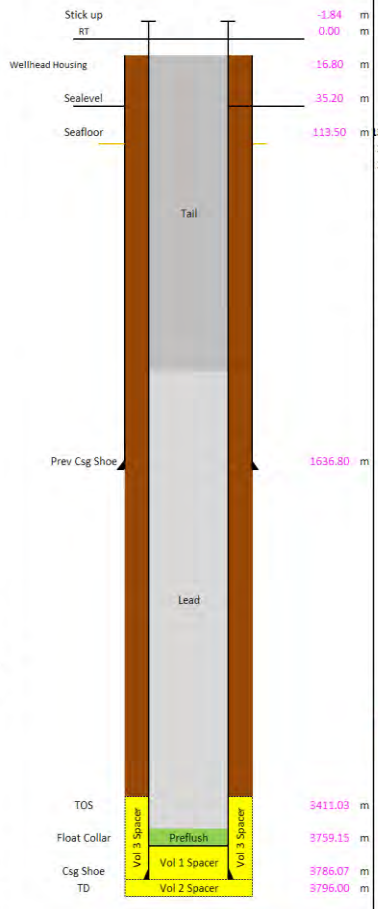
Notes and Assumptions

Texts in BLACK: EW verified input data as per EV0000028.
Texts in RED: For further details, refer to Table 3 in Vol 2 of the the Expert Witness Response to NOSPA Issues 1 to 9 - Montara H1-ST1 Blowout.
Texts in PINK: EW calculated data.
Texts in BLUE: Data extracted from "DB-30291-NOPSA-419".

No losses have been assumed for these calculations as reported in the Dail Mud Reported dated 07/03/09 "EV0000034".

The EW has assumed a 0% hole excess for the 12 1/4" Open hole, based on the calculations used to achieve the reported cementing differential pressure of 1200 psi as stated in NOPSA's "Assumed Facts".

EW Verified Schematic



EW Calculated Values

Cement Calculations

Capacities	bbls/ft	bbls/m
Running String 1	0.075	0.246
Running String 2	Nil	Nil
Stinger	Nil	Nil
Casing 1	0.075	0.246
Casing 2	Nil	Nil
Casing 3	Nil	Nil
13 3/8" Casing x 9 5/8" Casing	0.061	0.200
12 1/4" OH x 9 5/8" Casing	0.056	0.183
17 1/2" OH x 9 5/8" Casing	0.208	0.681
Rathole	0.146	0.478

SW Calculated Volumes	
Vol 1 (bbls)	6.61
Vol2 (bbls)	4.75

Open Hole Excess	0%

Phase 2: Spacer in Annulus

	bbl	MD height in annulus (m)	Start MD (m)	End MD (m)	Start TVD (m)	End TVD (m)	TVD height (m)
Remaining Mud Vol	651.33	3411.03	3411.03	0.00	2651.78	0.00	2651.78
Spacer Vol Pumped	80.00	375.04	3796.00	3411.03	2653.00	2651.78	1.22

Annulus BHP @ TD due to Fluid Column

Fluid	Fluid Density (ppg)	Pressure Gradient (psi/ft)	Hydrostatic Pressure of fluid Column (psi)
Mud	9.6	0.499	4343.288
Spacer	10.5	0.546	2.182
Total Pressure (psi)			4345

Cementing Calculation Worksheet Description

This worksheet presents the calculation of static Bottom Hole Pressure (BHP) at the FINAL WELL DEPTH after displacing 80 bbl of 10.5 ppg Spacer through the 9 5/8" (244mm) Float Collar.
This worksheet is the second (2nd) of twelve (12) worksheets, and provides an appreciation of how the BHPs varies throughout the different stages of the H1-ST1 9 5/8" (244mm) cementing operations in the annulus due to the displacement of different fluid column(s).
This worksheet also shows that, despite the introduction of a heavier fluid (10.5 ppg Spacer) into the annulus space of the H1-ST1 Wellbore, the equivalent BHP had not varied significantly in comparison to the BHP calculated in Phase 1 (XLS-30291-NOPSA-003-9 5/8" Cmt Calcs 1). The reason can be attributed to the Spacer occupying the annular space in a long horizontal section of the H1-ST1 Well, thus effecting minimum hydrostatic pressure in the annulus.

5.4 Pseudo Static Equivalent Annulus BHP while Circulating 5bbl DW below Float Collar

SW ISO Doc Ref No:	XLS-30291-NOPSA-003-9 5/8" Cmt Calcs 3
Prepared by:	SEAN FOO / YEO MIN
Reviewed & Approved by:	COLIN STUART
Date:	16-Feb-12
Rev No:	1

H1-ST1 well, 9 5/8" CSG, Pseudo Static Equivalent Annulus BHP while Circulating 5bbl DW below Float Collar

EW Verified Input Data from DDR

Well Data

RT	35.20	m
Water Depth	78.30	m
Top Wellhead	16.80	m
Mudline	113.50	m
Previous Casing Shoe	1636.80	m
Hole Size	12.25	in
Section TD	3796.00	m

Casing Data

Casing Shoe At	3786.07	m
Casing Shoe ID	8.78	in
Float Collar At	3759.15	m
Casing 1 Length	3759.15	m
Casing 1 OD	9.63	in
Casing 1 ID	8.78	in
Casing 2 Length	0.00	m
Casing 2 OD	0.00	in
Casing 2 ID	0.00	in
Casing 3 Length	0.00	m
Casing 3 OD	0.00	in
Casing 3 ID	0.00	in
Previous Casing OD	13.38	in
Previous Casing ID	12.46	in
Previous Hole size below previous shoe	17.50	in

Running String Data

Running String 1 Length	1.84	m
Running String 1 ID	8.78	in
Running String 2 Length	0.00	m
Running String 2 ID	0.00	in
Stick-up above RT	1.84	m
Stinger Length	0.00	m
Stinger ID	0.00	in

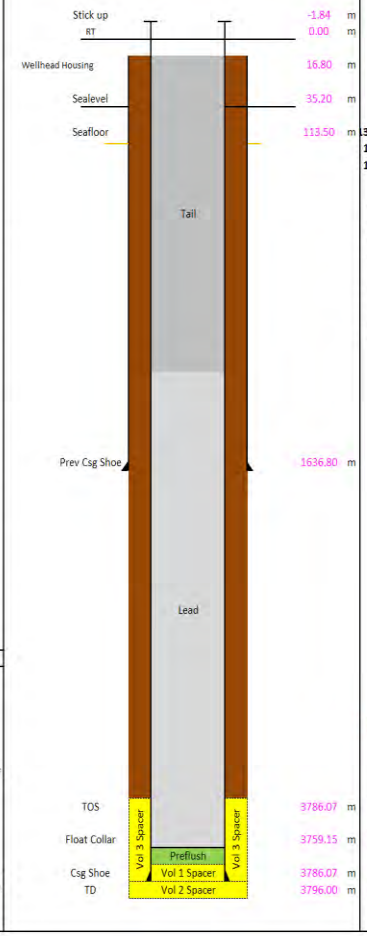
Cement Data

Length of Lead in cased hole	50.00	m
Length of Lead in 17 1/2" cased hole	7.20	m
Length of Lead in OH	1599.27	m
Length of Tail	550.00	m

Notes and Assumptions

Texts in BLACK: EW verified input data as per EV0000028.
Texts in Red: For further details, refer to Table 3 in Vol 2 of the the Expert Witness Response to NOSPA Issues 1 to 9 - Montara H1-ST1 Blowout.
Texts in BROWN: EW calculated data.
Texts in BLUE: Data extracted from "DB-30291-NOPSA-419".
Texts in GREEN: For further details, refer to Table 3 in Vol 2 of the the Expert Witness Response to NOSPA Issues 1 to 9 - Montara H1-ST1 Blowout.
No losses have been assumed for these calculations as reported in the Dail Mud Reported dated 07/03/09 "EV0000034".
The EW has assumed a 0% hole excess for the 12 1/4" Open hole, based on the calculations used to achieve the reported cementing differential pressure of 1200 psi as stated in NOPSA's "Assumed Facts".

EW Verified Schematic



EW Calculated Values

Cement Calculations

Capacities	bbls/ft	bbls/m
Running String 1	0.075	0.246
Running String 2	Nil	Nil
Stinger	Nil	Nil
Casing 1	0.075	0.246
Casing 2	Nil	Nil
Casing 3	Nil	Nil
13 3/8" Casing x 9 5/8" Casing	0.061	0.200
12 1/4" OH x 9 5/8" Casing	0.056	0.183
17 1/2" OH x 9 5/8" Casing	0.208	0.681
Rathole	0.146	0.478

SW Calculated Volumes	
Vol 1 (bbls)	1.61
Vol2 (bbls)	4.75
Vol 3 (bbls)	73.64
Preflush (bbls)	5.00

Open Hole Excess	0%

Phase 3: Pre Flush in annulus

	bbl	MD height in annulus (m)	Start MD (m)	End MD (m)	Start TVD (m)	End TVD (m)	TVD height (m)
Remaining Mud Vol	646.33	3383.71	3383.71	0.00	2651.45	0.00	2651.45
Spacer Vol Pumped	80.00	402.36	3796.00	3383.71	2653.00	2651.45	1.55
PreFlush Vol Pumped	5.00	20.35	3779.50	3759.15	2653.01	2653.06	-0.05

Annulus BHP @ TD due to Fluid Column

Fluid	Fluid Density (ppg)	Pressure Gradient (psi/ft)	Hydrostatic Pressure of fluid Column (psi)
Mud	9.6	0.499	4342.744
Spacer	10.5	0.546	2.777
Pre Flush	8.66	0.450	-0.077
Total Pressure (psi)			4345

Cementing Calculation Worksheet Description

This worksheet presents the calculation of static Bottom Hole Pressure (BHP) at the FINAL WELL DEPTH after displacing 5 bbl of 8.66 ppg Pre-flush through the 9 5/8" (244mm) Float Collar.
This worksheet is the third (3rd) of twelve (12) worksheets, and provides an appreciation of how the BHPs varies throughout the different stages of the H1-ST1 9 5/8" (244mm) cementing operations in the annulus, due to the displacement of different fluid column(s). This worksheet also shows that the 5 bbl of pre-flush has minimum contributions to the overall BHP exerted by the fluid columns in the H1-ST1 annulus, in part due to the small amount displaced across the float collar, and in part due to a long horizontal section of the H1-ST1 Well.

5.5 Pseudo Static Equivalent Annulus BHP while Circulating LEAD Slurry below Float Collar

SW ISO Doc Ref No:	XLS-30291-NOPSA-003-9 5/8" Cmt Calcs 4
Prepared by:	SEAN FOO / YEO MIN
Reviewed & Approved by:	COLIN STUART
Date:	16-Feb-12
Rev No:	1

H1-ST1 well, 9 5/8" CSG, Pseudo Static Equivalent Annulus BHP while Circulating LEAD Slurry below Float Collar

EW Verified Input Data from DDR

Well Data

RT	35.20	m
Water Depth	78.30	m
Top Wellhead	16.80	m
Mudline	113.50	m
Previous Casing Shoe	1636.80	m
Hole Size	12.25	in
Section TD	3796.00	m

Casing Data

Casing Shoe At	3786.07	m
Casing Shoe ID	8.78	in
Float Collar At	3759.15	m
Casing 1 Length	3759.15	m
Casing 1 OD	9.63	in
Casing 1 ID	8.78	in
Casing 2 Length	0.00	m
Casing 2 OD	0.00	in
Casing 2 ID	0.00	in
Casing 3 Length	0.00	m
Casing 3 OD	0.00	in
Casing 3 ID	0.00	in
Previous Casing OD	13.38	in
Previous Casing ID	12.46	in
Previous Hole size below previous shoe	17.50	in

Running String Data

Running String 1 Length	1.84	m
Running String 1 ID	8.78	in
Running String 2 Length	0.00	m
Running String 2 ID	0.00	in
Stick-up above RT	1.84	m
Stinger Length	0.00	m
Stinger ID	0.00	in

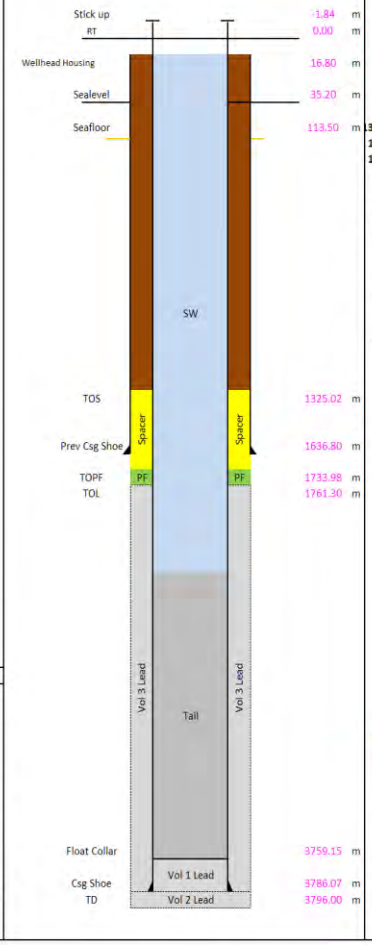
Cement Data

Length of Lead in cased hole	50.00	m
Length of Lead in 17 1/2" cased hole	7.20	m
Length of Lead in OH	1599.27	m
Length of Tail	550.00	m

Notes and Assumptions

Texts in BLACK: EW verified input data as per EV0000028.
Texts in Red: Refer to Table 3 in Vol 2 of the the Expert Witness Response to NOSPA Issues 1 to 9 - Montara H1-ST1 Blowout.
Texts in PINK: EW calculated data.
Texts in BLUE: Data extracted from "DB-30291-NOPSA-419".
Texts in GREEN: Refer to Table 3 in Vol 2 of the the Expert Witness Response to NOSPA Issues 1 to 9 - Montara H1-ST1 Blowout.
No losses have been assumed for these calculations as reported in the Dail Mud Reported dated 07/03/09 "EV0000034".
The EW has assumed a 0% hole excess for the 12 1/4" Open hole, based on the calculations used to achieve the reported cementing differential pressure of 1200 psi as stated in NOPSA's "Assumed Facts".

EW Verified Schematic



Stick up	-1.84	m
RT	0.00	m
Wellhead Housing	16.80	m
Sealevel	35.20	m
Seafloor	113.50	m
TOS	1325.02	m
Prev Csg Shoe	1636.80	m
TOPF	1733.98	m
TOL	1761.30	m
Float Collar	3759.15	m
Csg Shoe	3786.07	m
TD	3796.00	m

EW Calculated Values

Cement Calculations

Capacities	bbls/ft	bbls/m
Running String 1	0.075	0.246
Running String 2	Nil	Nil
Stinger	Nil	Nil
Casing 1	0.075	0.246
Casing 2	Nil	Nil
Casing 3	Nil	Nil
13 3/8" Casing x 9 5/8" Casing	0.061	0.200
12 1/4" OH x 9 5/8" Casing	0.056	0.183
17 1/2" OH x 9 5/8" Casing	0.208	0.681
Rathole	0.146	0.478

SW Calculated Volumes	
Vol 1 LEAD (bbls)	6.61
Vol 2 LEAD (bbls)	4.75
Vol 3 LEAD (bbls)	370.56
Spacer Vol No OH Xces	17.78
Spacer Vol Abv 13 3/8" shoe	62.22

Open Hole Excess	0%

Phase 4: Pumped Lead Slurry

	bbl	MD height in annulus (m)	Start MD (m)	End MD (m)	Start TVD (m)	End TVD (m)	TVD height (m)
Remaining Mud Vol	264.41	1325.02	1325.02	0.00	1322.16	0.00	1322.16
Spacer Vol	80.00	408.96	1733.98	1325.02	1722.48	1322.16	400.32
Pre Flush Vol	5.00	27.32	1761.30	1733.98	1748.68	1722.48	26.20
Lead Vol Pumped	381.92	2024.77	3796.00	1761.30	2653	1749	904.32

Annulus BHP @ TD due to Fluid Column

Fluid	Fluid Density (ppg)	Pressure Gradient (psi/ft)	Hydrostatic Pressure of fluid Column (psi)
Mud	9.6	0.499	2165.525
Spacer	10.5	0.546	717.152
Pre Flush	8.66	0.450	38.723
Lead Slurry	12	0.624	1851.457
Total Pressure (psi)			4773

Cementing Calculation Worksheet Description

This worksheet presents the calculation of static Bottom Hole Pressure (BHP) at the FINAL WELL DEPTH after displacing 381.9 bbl of 12 ppg Lead Slurry through the 9 5/8" (244mm) Float Collar.
This worksheet is the fourth (4th) of twelve (12) worksheets, and provides an appreciation of how the BHPs varies throughout the different stages of the H1-ST1 9 5/8" (244mm) cementing operations in the annulus, due to the displacement of different fluid column(s). This worksheet also shows a marked increase in BHP as a direct result of heavier and larger volume of lead cement being displaced into the annulus of the H1-ST1 Well.

5.6 Pseudo Static Equivalent Annulus BHP while Circulating TAIL Slurry below Float Collar

SW ISO Doc Ref No:	XLS-30291-NOPSA-003-9 5/8" Cmt Calcs 5
Prepared by:	SEAN FOO / YEO MIN
Reviewed & Approved by:	COLIN STUART
Date:	16-Feb-12
Rev No:	1

H1-ST1 well, 9 5/8" CSG, Pseudo Static Equivalent Annulus BHP while Circulating TAIL Slurry below Float Collar

EW Verified Input Data from DDR

Well Data

RT	35.20	m
Water Depth	78.30	m
Top Wellhead	16.80	m
Mudline	113.50	m
Previous Casing Shoe	1636.80	m
Hole Size	12.25	in
Section TD	3796.00	m

Casing Data

Casing Shoe At	3786.07	m
Casing Shoe ID	8.78	in
Float Collar At	3759.15	m
Casing 1 Length	3759.15	m
Casing 1 OD	9.63	in
Casing 1 ID	8.78	in
Casing 2 Length	0.00	m
Casing 2 OD	0.00	in
Casing 2 ID	0.00	in
Casing 3 Length	0.00	m
Casing 3 OD	0.00	in
Casing 3 ID	0.00	in
Previous Casing OD	13.38	in
Previous Casing ID	12.46	in
Previous Hole size below previous shoe	17.50	in

Running String Data

Running String 1 Length	1.84	m
Running String 1 ID	8.78	in
Running String 2 Length	0.00	m
Running String 2 ID	0.00	in
Stick-up above RT	1.84	m
Stinger Length	0.00	m
Stinger ID	0.00	in

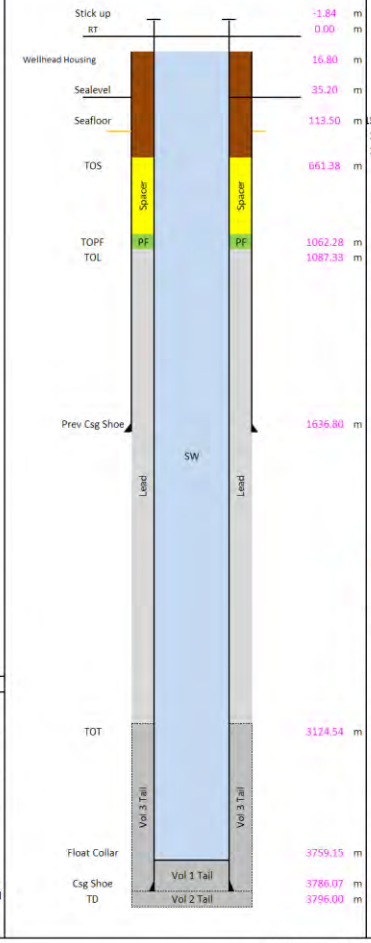
Cement Data

Length of Lead in cased hole	50.00	m
Length of Lead in 17 1/2" cased hole	7.20	m
Length of Lead in OH	1599.27	m
Length of Tail	550.00	m

Notes and Assumptions

Texts in BLACK: EW verified input data as per EV0000028.
Texts in Red: Refer to Table 3 in Vol 2 of the the Expert Witness Response to NOSPA Issues 1 to 9 - Montara H1-ST1 Blowout.
Texts in PINK: EW calculated data.
Texts in BLUE: Data extracted from "DB-30291-NOPSA-419".
Texts in GREEN: Refer to Table 3 in Vol 2 of the the Expert Witness Response to NOSPA Issues 1 to 9 - Montara H1-ST1 Blowout.
No losses have been assumed for these calculations as reported in the Dail Mud Reported dated 07/03/09 "EV0000034".
The EW has assumed a 0% hole excess for the 12 1/4" Open hole, based on the calculations used to achieve the reported cementing differential pressure of 1200 psi as stated in NOPSA's "Assumed Facts".

EW Verified Schematic



EW Calculated Values

Cement Calculations

Capacities	bbls/ft	bbls/m
Running String 1	0.075	0.246
Running String 2	Nil	Nil
Stinger	Nil	Nil
Casing 1	0.075	0.246
Casing 2	Nil	Nil
Casing 3	Nil	Nil
13 3/8" Casing x 9 5/8" Casing	0.061	0.200
12 1/4" OH x 9 5/8" Casing	0.056	0.183
17 1/2" OH x 9 5/8" Casing	0.208	0.681
Rathole	0.146	0.478

SW Calculated Volumes	
Vol 1TAIL (bbls)	6.61
Vol 2 TAIL (bbls)	4.75
Vol 3 TAIL (bbls)	121.07
LEAD Vol No OH Xces	272.27
LEAD Vol Abv 13 3/8" shoe	109.65

Open Hole Excess	0%

Phase 5: Pumped Tail Slurry

	bbl	MD height in annulus (m)	Start MD (m)	End MD (m)	Start TVD (m)	End TVD (m)	TVD height (m)
Remaining Mud Vol	131.98	661.38	661.38	0.00	660.63	0.00	660.63
Spacer Vol	80.00	400.90	1062.28	661.38	1059.86	660.63	399.23
Pre Flush Vol	5.00	25.06	1087.33	1062.28	1084.81	1059.86	24.96
Lead Slurry Vol	381.92	2037.21	3124.54	1087.33	2629	1085	1544.67
Tail Slurry Volume	132.43	661.53	3796.00	3124.54	2653.00	2629.49	23.51

Internal Casing BHP (Prior to Plug Bump)

Fluid	Fluid Density (ppg)	Pressure Gradient (psi/ft)	Hydrostatic Pressure of fluid Column (psi)
SW	8.66	0.450	3920.985
Tail Slurry	15.8	0.822	0.000
Total Pressure (psi)			3921

Annulus BHP @ TD due to Fluid Column

Fluid	Fluid Density (ppg)	Pressure Gradient (psi/ft)	Hydrostatic Pressure of fluid Column (psi)
Mud	9.6	0.499	1082.026
Spacer	10.5	0.546	715.189
Pre Flush	8.66	0.450	36.887
Lead Slurry	12	0.624	3162.477
Tail Slurry	15.8	0.822	63.384
Total Pressure (psi)			5060

Differential Pressure (psi)		1139

SWPL Cementing Calculation Worksheet Description

This worksheet presents the calculation of static Bottom Hole Pressure (BHP) at the FINAL WELL DEPTH after displacing 132.43 bbl of 15.8 ppg Tail Slurry through the 9 5/8" (244mm) Float Collar.
This worksheet is the fifth (5th) of twelve (12) worksheets, and provides an appreciation of how the BHPs vary throughout the different stages of the H1-ST1 9 5/8" (244mm) cementing operations in the annulus, due to the displacement of different fluid column(s). This worksheet also shows a marked increase in BHP as a direct result of heavier and larger volume of Tail cement, in addition to the lead, being displaced into the annulus of the H1-ST1 Well.
The differential pressure of 1139 psi, as calculated by the EW, is achieved using a 0% open hole excess volume, and is in close agreement with the 1300 psi final circulating pressure recorded by PTTEPAA just before plug bump. This shows that the 12 1/4" H1-ST1 section is a gauged hole, and not in excess by 25% as assumed by PTTEPAA in "EV0000028".
Running a caliper log, or circulating a carbide pill prior to the cementing operation, would have allowed PTTEPAA to establish a better understanding of the H1-ST1 Wellbore condition.

5.7 Pseudo Static Equivalent Annulus BHP while Pressure Test to 4000psi after Plug Bump

SW ISO Doc Ref No:	XLS-30291-NOPSA-003-9 5/8" Cmt Calcs 6
Prepared by:	SEAN FOO / YEO MIN
Reviewed & Approved by:	COLIN STUART
Date:	16-Feb-12
Rev No:	1

H1-ST1 well, 9 5/8" CSG, Pseudo Static Equivalent Annulus BHP while Pressure Test to 4000psi after Plug Bump

EW Verified Input Data from DDR

Well Data

RT	35.20	m
Water Depth	78.30	m
Top Wellhead	16.80	m
Mudline	113.50	m
Previous Casing Shoe	1636.80	m
Hole Size	12.25	in
Section TD	3796.00	m

Casing Data

Casing Shoe At	3786.07	m
Casing Shoe ID	8.78	in
Float Collar At	3759.15	m
Casing 1 Length	3759.15	m
Casing 1 OD	9.63	in
Casing 1 ID	8.78	in
Casing 2 Length	0.00	m
Casing 2 OD	0.00	in
Casing 2 ID	0.00	in
Casing 3 Length	0.00	m
Casing 3 OD	0.00	in
Casing 3 ID	0.00	in
Previous Casing OD	13.38	in
Previous Casing ID	12.46	in
Previous Hole size below previous shoe	17.50	in

Running String Data

Running String 1 Length	1.84	m
Running String 1 ID	8.78	in
Running String 2 Length	0.00	m
Running String 2 ID	0.00	in
Stick-up above RT	1.84	m
Stinger Length	0.00	m
Stinger ID	0.00	in

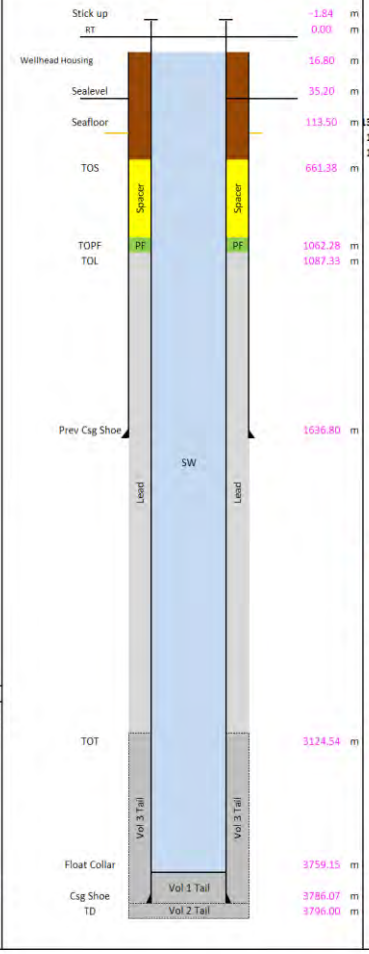
Cement Data

Length of Lead in cased hole	50.00	m
Length of Lead in 17 1/2" cased hole	7.20	m
Length of Lead in OH	1599.27	m
Length of Tail	550.00	m

Notes and Assumptions

Texts in BLACK: EW verified input data as per EV0000028.
Texts in Red: efer to Table 3 in Vol 2 of the the Expert Witness Response to NOSPA Issues 1 to 9 - Montara H1-ST1 Blowout.
Texts in PINK: EW calculated data.
Texts in BLUE: Data extracted from "DB-30291-NOPSA-419".
Texts in GREEN: efer to Table 3 in Vol 2 of the the Expert Witness Response to NOSPA Issues 1 to 9 - Montara H1-ST1 Blowout.
No losses have been assumed for these calculations as reported in the Dail Mud Reported dated 07/03/09 "EV0000034".
The EW has assumed a 0% hole excess for the 12 1/4" Open hole, based on the calculations used to achieve the reported cementing differential pressure of 1200 psi as stated in NOPSA's "Assumed Facts".

EW Verified Schematic



EW Calculated Values

Cement Calculations

Capacities	bbls/ft	bbls/m
Running String 1	0.075	0.246
Running String 2	Nil	Nil
Stinger	Nil	Nil
Casing 1	0.075	0.246
Casing 2	Nil	Nil
Casing 3	Nil	Nil
13 3/8" Casing x 9 5/8" Casing	0.061	0.200
12 1/4" OH x 9 5/8" Casing	0.056	0.183
17 1/2" OH x 9 5/8" Casing	0.208	0.681
Rathole	0.146	0.478

SW Calculated Volumes	
Vol 1TAIL (bbls)	6.61
Vol 2 TAIL (bbls)	4.75
Vol 3 TAIL (bbls)	121.07
LEAD Vol No OH Xces	272.27
LEAD Vol Abv 13 3/8" shoe	109.65

Open Hole Excess	0%

Phase 6: Pressure Test of 4000 psi after Top Plug Bump

	bbl	MD height in annulus (m)	Start MD (m)	End MD (m)	Start TVD (m)	End TVD (m)	TVD height (m)
Remaining Mud Vol	131.98	661.38	661.38	0.00	660.63	0.00	660.63
Spacer Vol	80.00	400.90	1062.28	661.38	1059.86	660.63	399.23
Pre Flush Vol	5.00	25.06	1087.33	1062.28	1084.81	1059.86	24.96
Lead Slurry Vol	381.92	2037.21	3124.54	1087.33	2629	1085	1544.67
Tail Slurry Volume	132.43	661.53	3796.00	3124.54	2653.00	2629.49	23.51

Annulus BHP @ TD due to Fluid Column

Fluid	Fluid Density (ppg)	Pressure Gradient (psi/ft)	Hydrostatic Pressure of fluid Column (psi)
Mud	9.6	0.499	1082.026
Spacer	10.5	0.546	715.189
Pre Flush	8.66	0.450	36.887
Lead Slurry	12	0.624	3162.477
Tail Slurry	15.8	0.822	63.384
Total Pressure (psi)			5060

Internal BHP @ Float Collar

Fluid	Fluid Density (ppg)	Pressure Gradient (psi/ft)	Hydrostatic Pressure of fluid Column (psi)
Seawater	8.66	0.450	3920.985
Test Pressure			4000.000
Total Pressure (psi)			7921

Cementing Calculation Worksheet Description

This worksheet presents the calculation of static Bottom Hole Pressure (BHP) at the FINAL WELL DEPTH after the 4000 psi Positive 9 5/8" Casing Pressure Test.
This worksheet is the sixth (6th) of twelve (12) worksheets, and provides an appreciation of how the Pressure Test had no effects on the 9 5/8" (244mm) annulus BHP at the FINAL WELL DEPTH, as a result of the Top Plug isolating the Displacement Fluid from the cement slurries.

5.8 Pseudo Static Equivalent Annulus BHP after Casing Pressure Test - 9 bbl Bleed Off

SW ISO Doc Ref No:	XLS-30291-NOPSA-003-9 5/8" Cmt Calcs 7
Prepared by:	SEAN FOO / YEO MIN
Reviewed & Approved by:	COLIN STUART
Date:	16-Feb-12
Rev No:	1

H1-ST1 well, 9 5/8" CSG, Pseudo Static Equivalent Annulus BHP after Casing Pressure Test - 9 bbl Bleed Off

EW Verified Input Data from DDR

Well Data

RT	35.20	m
Water Depth	78.30	m
Top Wellhead	16.80	m
Mudline	113.50	m
Previous Casing Shoe	1636.80	m
Hole Size	12.25	in
Section TD	3796.00	m

Casing Data

Casing Shoe At	3786.07	m
Casing Shoe ID	8.78	in
Float Collar At	3759.15	m
Casing 1 Length	3759.15	m
Casing 1 OD	9.63	in
Casing 1 ID	8.78	in
Casing 2 Length	0.00	m
Casing 2 OD	0.00	in
Casing 2 ID	0.00	in
Casing 3 Length	0.00	m
Casing 3 OD	0.00	in
Casing 3 ID	0.00	in
Previous Casing OD	13.38	in
Previous Casing ID	12.46	in
Previous Hole size below previous shoe	17.50	in

Running String Data

Running String 1 Length	1.84	m
Running String 1 ID	8.78	in
Running String 2 Length	0.00	m
Running String 2 ID	0.00	in
Stick-up above RT	1.84	m
Stinger Length	0.00	m
Stinger ID	0.00	in

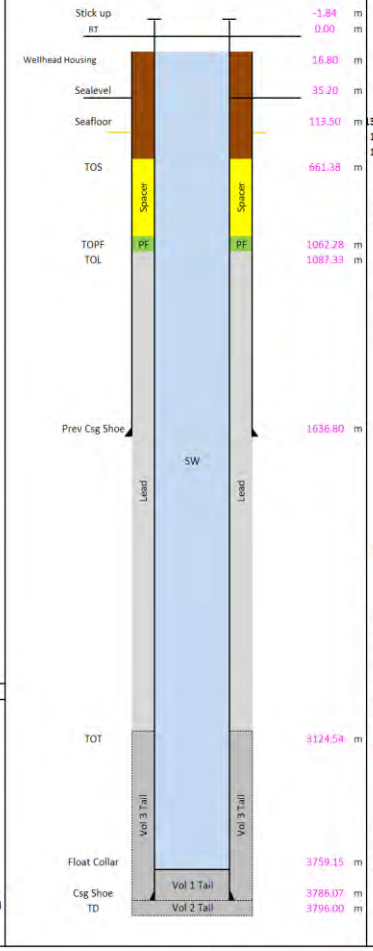
Cement Data

Length of Lead in cased hole	50.00	m
Length of Lead in 17 1/2" cased hole	7.20	m
Length of Lead in OH	1599.27	m
Length of Tail	550.00	m

Notes and Assumptions

Texts in BLACK: EW verified input data as per EV0000028.
Texts in Red: Refer to Table 3 in Vol 2 of the the Expert Witness Response to NOSPA Issues 1 to 9 - Montara H1-ST1 Blowout.
Texts in PINK: EW calculated data.
Texts in BLUE: Data extracted from "DB-30291-NOPSA-419".
Texts in GREEN: Refer to Table 3 in Vol 2 of the the Expert Witness Response to NOSPA Issues 1 to 9 - Montara H1-ST1 Blowout.
No losses have been assumed for these calculations as reported in the Dail Mud Reported dated 07/03/09 "EV0000034".
The EW has assumed a 0% hole excess for the 12 1/4" Open hole, based on the calculations used to achieve the reported cementing differential pressure of 1200 psi as stated in NOPSA's "Assumed Facts".

EW Verified Schematic



EW Calculated Values

Cement Calculations

Capacities	bbls/ft	bbls/m
Running String 1	0.075	0.246
Running String 2	Nil	Nil
Stinger	Nil	Nil
Casing 1	0.075	0.246
Casing 2	Nil	Nil
Casing 3	Nil	Nil
13 3/8" Casing x 9 5/8" Casing	0.061	0.200
12 1/4" OH x 9 5/8" Casing	0.056	0.183
17 1/2" OH x 9 5/8" Casing	0.208	0.681
Rathole	0.146	0.478

SW Calculated Volumes	
Vol 1TAIL (bbls)	6.61
Vol 2 TAIL (bbls)	4.75
Vol 3 TAIL (bbls)	121.07
LEAD Vol No OH Xces	272.27
LEAD Vol Abv 13 3/8" shoe	109.65

Open Hole Excess	0%

Phase 7: 9 bbl Bled Back

	bbl	MD height in annulus (m)	Start MD (m)	End MD (m)	Start TVD (m)	End TVD (m)	TVD height (m)
Remaining Mud Vol	131.98	661.38	661.38	0.00	660.63	0.00	660.63
Spacer Vol	80.00	400.90	1062.28	661.38	1059.86	660.63	399.23
Pre Flush Vol	5.00	25.06	1087.33	1062.28	1084.81	1059.86	24.96
Lead Slurry Vol	381.92	2037.21	3124.54	1087.33	2629	1085	1544.67
Tail Slurry Volume	132.43	661.53	3796.00	3124.54	2653.00	2629.49	23.51

Annulus BHP @ TD due to Fluid Column

Fluid	Fluid Density (ppg)	Pressure Gradient (psi/ft)	Hydrostatic Pressure of fluid Column (psi)
Mud	9.6	0.499	1082.026
Spacer	10.5	0.546	715.189
Pre Flush	8.66	0.450	36.887
Lead Slurry	12	0.624	3162.477
Tail Slurry	15.8	0.822	63.384
Total Pressure (psi)			**5060**

Internal BHP @ Float Collar

Fluid	Fluid Density (ppg)	Pressure Gradient (psi/ft)	Hydrostatic Pressure of fluid Column (psi)
Seawater	8.66	0.450	3920.985
Test Pressure			200.000
Total Pressure (psi)			**4121**

Cementing Calculation Worksheet Description

This worksheet presents the calculation of static Bottom Hole Pressure (BHP) at the FINAL WELL DEPTH after bleeding down the 4000 psi Positive Casing Pressure Test.
This worksheet is the seventh (7th) of twelve (12) worksheets, and provides an appreciation of how the Bleed down of the 4000 psi Pressure Test had no effects on the 9 5/8" (244mm) annulus BHP at the FINAL WELL DEPTH, as a result of the Top Plug isolating the Displacement Fluid from the cement slurries.

5.9 Pseudo Static Equivalent Annulus BHP Post Casing Pressure Test – Pressure Spike to 1300psi Observed

SW ISO Doc Ref No:	XLS-30291-NOPSA-003-9 5/8" Cmt Calcs 8
Prepared by:	SEAN FOO / YEO MIN
Reviewed & Approved by:	COLIN STUART
Date:	16-Feb-12
Rev No:	1

H1-ST1 well, 9 5/8" CSG, Pseudo Static Equivalent Annulus BHP Post Casing Pressure Test - Pressure Spike to 1300psi observed

EW Verified Input Data from DDR

Well Data

RT	35.20	m
Water Depth	78.30	m
Top Wellhead	16.80	m
Mudline	113.50	m
Previous Casing Shoe	1636.80	m
Hole Size	12.25	in
Section TD	3796.00	m

Casing Data

Casing Shoe At	3786.07	m
Casing Shoe ID	8.78	in
Float Collar At	3759.15	m
Casing 1 Length	3759.15	m
Casing 1 OD	9.63	in
Casing 1 ID	8.78	in
Casing 2 Length	0.00	m
Casing 2 OD	0.00	in
Casing 2 ID	0.00	in
Casing 3 Length	0.00	m
Casing 3 OD	0.00	in
Casing 3 ID	0.00	in
Previous Casing OD	13.38	in
Previous Casing ID	12.46	in
Previous Hole size below previous shoe	17.50	in

Running String Data

Running String 1 Length	1.84	m
Running String 1 ID	8.78	in
Running String 2 Length	0.00	m
Running String 2 ID	0.00	in
Stick-up above RT	1.84	m
Stinger Length	0.00	m
Stinger ID	0.00	in

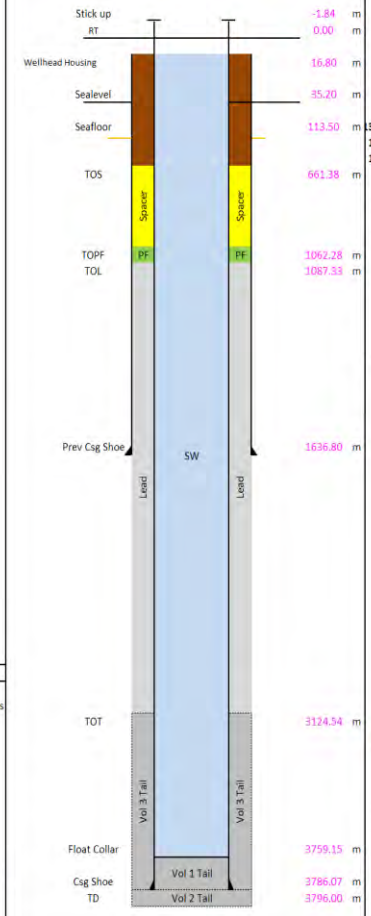
Cement Data

Length of Lead in cased hole	50.00	m
Length of Lead in 17 1/2" cased hole	7.20	m
Length of Lead in OH	1599.27	m
Length of Tail	550.00	m

Notes and Assumptions

Texts in BLACK: EW verified input data as per EV0000028.
Texts in Red: Refer to Table 3 in Vol 2 of the the Expert Witness Response to NOSPA Issues 1 to 9 - Montara H1-ST1 Blowout.
Texts in PINK: EW calculated data.
Texts in BLUE: Data extracted from "DB-30291-NOPSA-419".
Texts in GREEN: Refer to Table 3 in Vol 2 of the the Expert Witness Response to NOSPA Issues 1 to 9 - Montara H1-ST1 Blowout.
No losses have been assumed for these calculations as reported in the Dail Mud Reported dated 07/03/09 "EV0000034".
The EW has assumed a 0% hole excess for the 12 1/4" Open hole, based on the calculations used to achieve the reported cementing differential pressure of 1200 psi as stated in NOPSA's "Assumed Facts".

EW Verified Schematic



EW Calculated Values

Cement Calculations

Capacities	bbls/ft	bbls/m
Running String 1	0.075	0.246
Running String 2	Nil	Nil
Stinger	Nil	Nil
Casing 1	0.075	0.246
Casing 2	Nil	Nil
Casing 3	Nil	Nil
13 3/8" Casing x 9 5/8" Casing	0.061	0.200
12 1/4" OH x 9 5/8" Casing	0.056	0.183
17 1/2" OH x 9 5/8" Casing	0.208	0.681
Rathole	0.146	0.478

SW Calculated Volumes	
Vol 1TAIL (bbls)	6.61
Vol 2 TAIL (bbls)	4.75
Vol 3 TAIL (bbls)	121.07
LEAD Vol No OH Xces	272.27
LEAD Vol Abv 13 3/8" shoe	109.65

Open Hole Excess	0%

Phase 8: Pressure Spike to 1300psi

	bbl	MD height in annulus (m)	Start MD (m)	End MD (m)	Start TVD (m)	End TVD (m)	TVD height (m)
Remaining Mud Vol	131.98	661.38	661.38	0.00	660.63	0.00	660.63
Spacer Vol	80.00	400.90	1062.28	661.38	1059.86	660.63	399.23
Pre Flush Vol	5.00	25.06	1087.33	1062.28	1084.81	1059.86	24.96
Lead Slurry Vol	381.92	2037.21	3124.54	1087.33	2629	1085	1544.67
Tail Slurry Volume	132.43	661.53	3796.00	3124.54	2653.00	2629.49	23.51

Annulus BHP @ TD due to Fluid Column

Fluid	Fluid Density (ppg)	Pressure Gradient (psi/ft)	Hydrostatic Pressure of fluid Column (psi)
Mud	9.6	0.499	1082.026
Spacer	10.5	0.546	715.189
Pre Flush	8.66	0.450	36.887
Lead Slurry	12	0.624	3162.477
Tail Slurry	15.8	0.822	63.384
Total Pressure (psi)			5060

Cementing Calculation Worksheet Description

This worksheet presents the calculation of static Bottom Hole Pressure (BHP) at the FINAL WELL DEPTH after bleeding down the 4000 psi Positive Casing Pressure Test to 200 psi, and the observation of a 1300 psi pressure spike as an indication of casing float failures. This worksheet is the eighth (8th) of twelve (12) worksheets, and shows that the observation of an increased 1300 psi at surface, had no effect on the on the 9 5/8" (244mm) annulus BHP at the FINAL WELL DEPTH.

5.10 Pseudo Static Equivalent Annulus BHP Post Pressure Spike to 1300psi

SW ISO Doc Ref No:	XLS-30291-NOPSA-003-9 5/8" Cmt Calcs 9
Prepared by:	SEAN FOO / YEO MIN
Reviewed & Approved by:	COLIN STUART
Date:	16-Feb-12
Rev No:	1

H1-ST1 well, 9 5/8" CSG, Pseudo Static Equivalent Annulus BHP Post Pressure Spike to 1300psi

EW Verified Input Data from DDR

Well Data

RT	35.20	m
Water Depth	78.30	m
Top Wellhead	16.80	m
Mudline	113.50	m
Previous Casing Shoe	1636.80	m
Hole Size	12.25	in
Section TD	3796.00	m

Casing Data

Casing Shoe At	3786.07	m
Casing Shoe ID	8.78	in
Float Collar At	3759.15	m
Casing 1 Length	3759.15	m
Casing 1 OD	9.63	in
Casing 1 ID	8.78	in
Casing 2 Length	0.00	m
Casing 2 OD	0.00	in
Casing 2 ID	0.00	in
Casing 3 Length	0.00	m
Casing 3 OD	0.00	in
Casing 3 ID	0.00	in
Previous Casing OD	13.38	in
Previous Casing ID	12.46	in
Previous Hole size below previous shoe	17.50	in

Running String Data

Running String 1 Length	1.84	m
Running String 1 ID	8.78	in
Running String 2 Length	0.00	m
Running String 2 ID	0.00	in
Stick-up above RT	1.84	m
Stinger Length	0.00	m
Stinger ID	0.00	in

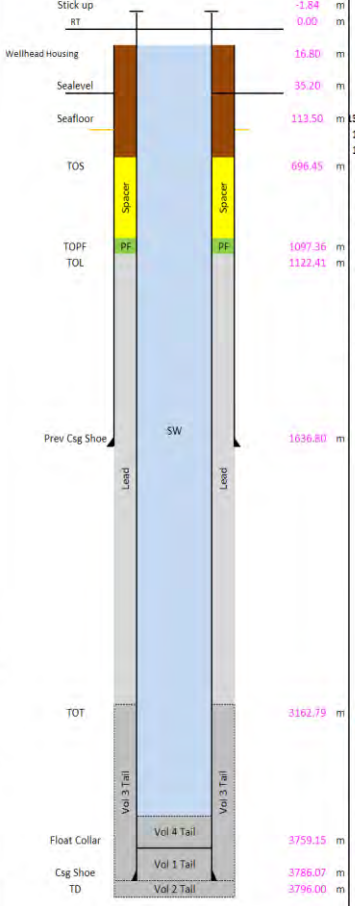
Cement Data

Length of Lead in cased hole	50.00	m
Length of Lead in 17 1/2" cased hole	7.20	m
Length of Lead in OH	1599.27	m
Length of Tail	550.00	m

Notes and Assumptions

Texts in BLACK: EW verified input data as per EV0000028.
Texts in Red: Refer to Table 3 in Vol 2 of the the Expert Witness Response to NOSPA Issues 1 to 9 - Montara H1-ST1 Blowout.
Texts in PINK: EW calculated data.
Texts in BLUE: Data extracted from "DB-30291-NOPSA-419".
Texts in GREEN: Refer to Table 3 in Vol 2 of the the Expert Witness Response to NOSPA Issues 1 to 9 - Montara H1-ST1 Blowout.
No losses have been assumed for these calculations as reported in the Dail Mud Reported dated 07/03/09 "EV0000034".
The EW has assumed a 0% hole excess for the 12 1/4" Open hole, based on the calculations used to achieve the reported cementing differential pressure of 1200 psi as stated in NOPSA's "Assumed Facts".

EW Verified Schematic



EW Calculated Values

Cement Calculations

Capacities	bbls/ft	bbls/m
Running String 1	0.075	0.246
Running String 2	Nil	Nil
Stinger	Nil	Nil
Casing 1	0.075	0.246
Casing 2	Nil	Nil
Casing 3	Nil	Nil
13 3/8" Casing x 9 5/8" Casing	0.061	0.200
12 1/4" OH x 9 5/8" Casing	0.056	0.183
17 1/2" OH x 9 5/8" Casing	0.208	0.681
Rathole	0.146	0.478

SW Calculated Volumes	
Vol 1TAIL (bbls)	6.81
Vol 2 TAIL (bbls)	4.75
Vol 3 TAIL (bbls)	114.07
Vol 4 TAIL (bbls)	7.00
LEAD Vol No OH Xces	279.27
LEAD Vol Abv 13 3/8" shoe	102.65

Open Hole Excess	0%

Phase 9: Bleed back of 7 bbl

	bbl	MD height in annulus (m)	Start MD (m)	End MD (m)	Start TVD (m)	End TVD (m)	TVD height (m)
Remaining Mud Vol	131.98	696.45	696.45	0.00	660.63	0.00	660.63
Spacer Vol	80.00	400.90	1097.36	696.45	1094.81	695.56	399.25
Pre Flush Vol	5.00	25.06	1122.41	1097.36	1119.80	1094.81	25.00
Lead Slurry Vol	381.92	2040.38	3162.79	1122.41	2635	1120	1514.84
Tail Slurry Volume	132.43	623.28	3796.00	3162.79	2653.00	2634.64	18.36

Annulus BHP @ TD due to Fluid Column

Fluid	Fluid Density (ppg)	Pressure Gradient (psi/ft)	Hydrostatic Pressure of fluid Column (psi)
Mud	9.6	0.499	1082.026
Spacer	10.5	0.546	715.226
Pre Flush	8.66	0.450	36.949
Lead Slurry	12	0.624	3101.389
Tail Slurry	15.8	0.822	49.493
Total Pressure (psi)			4985

Cementing Calculation Worksheet Description

This worksheet presents the calculation of static Bottom Hole Pressure (BHP) at the FINAL WELL DEPTH after a total of 16 bbl flowback was observed at surface (9 bbl was a result of bleeding off the 4000 psi casing test pressure - **AS EXPECTED**, and 7 bbl a result of the existence of a differential pressure between the H1-ST1 annulus and casing due to differences in fluid densities - **UNEXPECTED**).
This worksheet is the ninth (9th) of twelve (12) worksheets, and shows a small decrease in BHP at the FINAL WELL DEPTH as compared to Phase 8, due to a small flowback volume of cement back into the 9 5/8" casing through the float collar.

5.11 Pseudo Static Equivalent Annulus BHP Post 16bbl Overdisplacement

SW ISO Doc Ref No:	XLS-30291-NOPSA-003-9 5/8" Cmt Calcs 10
Prepared by:	SEAN FOO / YEO MIN
Reviewed & Approved by:	COLIN STUART
Date:	16-Feb-12
Rev No:	1

H1-ST1 well, 9 5/8" CSG, Pseudo Static Equivalent Annulus BHP Post 16bbl Overdisplacement

EW Verified Input Data from DDR

Well Data

RT	35.20	m
Water Depth	78.30	m
Top Wellhead	16.80	m
Mudline	113.50	m
Previous Casing Shoe	1636.80	m
Hole Size	12.25	in
Section TD	3796.00	m

Casing Data

Casing Shoe At	3786.07	m
Casing Shoe ID	8.78	in
Float Collar At	3759.15	m
Casing 1 Length	3759.15	m
Casing 1 OD	9.63	in
Casing 1 ID	8.78	in
Casing 2 Length	0.00	m
Casing 2 OD	0.00	in
Casing 2 ID	0.00	in
Casing 3 Length	0.00	m
Casing 3 OD	0.00	in
Casing 3 ID	0.00	in
Previous Casing OD	13.38	in
Previous Casing ID	12.46	in
Previous Hole size below previous shoe	17.50	in

Running String Data

Running String 1 Length	1.84	m
Running String 1 ID	8.78	in
Running String 2 Length	0.00	m
Running String 2 ID	0.00	in
Stick-up above RT	1.84	m
Stinger Length	0.00	m
Stinger ID	0.00	in

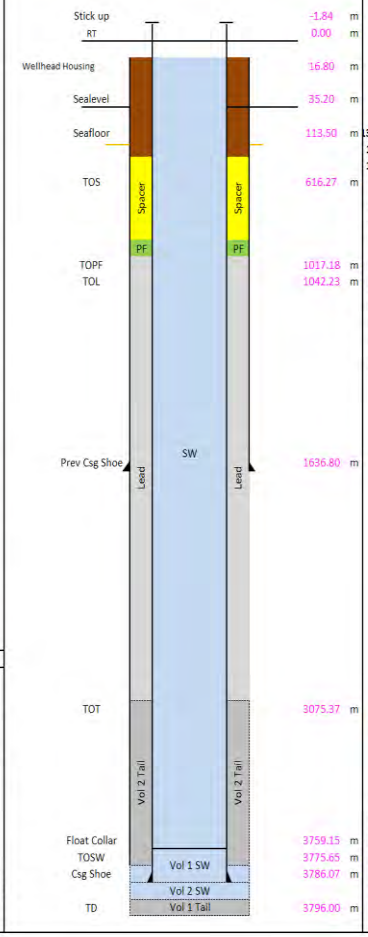
Cement Data

Length of Lead in cased hole	50.00	m
Length of Lead in 17 1/2" cased hole	7.20	m
Length of Lead in OH	1599.27	m
Length of Tail	550.00	m

Notes and Assumptions

Texts in BLACK: EW verified input data as per EV0000028.
Texts in Red: Refer to Table 3 in Vol 2 of the the Expert Witness Response to NOSPA Issues 1 to 9 - Montara H1-ST1 Blowout.
Texts in PINK: EW calculated data.
Texts in BLUE: Data extracted from "DB-30291-NOPSA-419".
Texts in GREEN: Refer to Table 3 in Vol 2 of the the Expert Witness Response to NOSPA Issues 1 to 9 - Montara H1-ST1 Blowout.
No losses have been assumed for these calculations as reported in the Dail Mud Reported dated 07/03/09 "EV0000034".
The EW has assumed a 0% hole excess for the 12 1/4" Open hole, based on the calculations used to achieve the reported cementing differential pressure of 1200 psi as stated in NOPSA's "Assumed Facts".

EW Verified Schematic



EW Calculated Values

Cement Calculations

Capacities	bbls/ft	bbls/m
Running String 1	0.075	0.246
Running String 2	Nil	Nil
Stinger	Nil	Nil
Casing 1	0.075	0.246
Casing 2	Nil	Nil
Casing 3	Nil	Nil
13 3/8" Casing x 9 5/8" Casing	0.061	0.200
12 1/4" OH x 9 5/8" Casing	0.056	0.183
17 1/2" OH x 9 5/8" Casing	0.208	0.681
Rathole	0.146	0.478

SW Calculated Volumes	
Vol 1 SW (bbls)	6.61
Vol 2 SW (bbls)	0.48
Vol 1 TAIL (bbls)	4.27
Vol 2 TAIL (bbls)	128.16
LEAD Vol No OH Xces	263.27
LEAD Vol Abv 13 3/8" shoe	118.65

Open Hole Excess	0%

Phase 10: Over Displacement of 16 bbl

	bbl	MD height in annulus (m)	Start MD (m)	End MD (m)	Start TVD (m)	End TVD (m)	TVD height (m)
Remaining Mud Vol	131.98	616.27	616.27	0.00	660.63	0.00	660.63
Spacer Vol	80.00	400.90	1017.18	616.27	1014.93	615.71	399.22
Pre Flush Vol	5.00	25.06	1042.23	1017.18	1039.89	1014.93	24.97
Lead Slurry Vol	381.92	2033.13	3075.37	1042.23	2622	1040	1581.83
Tail Slurry Volume	132.43	700.28	3775.65	3075.37	2653.01	2621.72	31.29

Annulus BHP @ TD due to Fluid Column

Fluid	Fluid Density (ppg)	Pressure Gradient (psi/ft)	Hydrostatic Pressure of fluid Column (psi)
Mud	9.6	0.499	1082.026
Spacer	10.5	0.546	715.171
Pre Flush	8.66	0.450	36.901
Lead Slurry	12	0.624	3238.550
Tail Slurry	15.8	0.822	84.348
Total Pressure (psi)			5157

Cementing Calculation Worksheet Description

This worksheet presents the calculation of static Bottom Hole Pressure (BHP) at the FINAL WELL DEPTH after a total of 16 bbl was displaced back into the H1-ST1 Well as a result of the 16 bbl flowback (described in Phase 9). This displacment of 16 bbl back into the H1-ST1 Well resulted in 7 bbl of cement and an additional 9 bbl of Seawater being displaced back below the float collar into the H1-ST1 Well.
This worksheet is the tenth (10th) of twelve (12) worksheets, and shows a small increase in BHP at the FINAL WELL DEPTH as compared to Phase 9, due to a higher top of tail and lead cement as a result of the over-displacement.

5.12 Pseudo Static Equivalent Annulus BHP, Post Overdisplacement, Wait on Cement Period

SW ISO Doc Ref No:	XLS-30291-NOPSA-003-9 5/8" Cmt Calcs 11
Prepared by:	SEAN FOO / YEO MIN
Reviewed & Approved by:	COLIN STUART
Date:	16-Feb-12
Rev No:	1

H1-ST1 well, 9 5/8" CSG, Pseudo Static Equivalent Annulus BHP, Post Overdisplacement, Wait on Cement Period

EW Verified Input Data from DDR

Well Data

RT	35.20	m
Water Depth	78.30	m
Top Wellhead	16.80	m
Mudline	113.50	m
Previous Casing Shoe	1636.80	m
Hole Size	12.25	in
Section TD	3796.00	m

Casing Data

Casing Shoe At	3786.07	m
Casing Shoe ID	8.78	in
Float Collar At	3759.15	m
Casing 1 Length	3759.15	m
Casing 1 OD	9.63	in
Casing 1 ID	8.78	in
Casing 2 Length	0.00	m
Casing 2 OD	0.00	in
Casing 2 ID	0.00	in
Casing 3 Length	0.00	m
Casing 3 OD	0.00	in
Casing 3 ID	0.00	in
Previous Casing OD	13.38	in
Previous Casing ID	12.46	in
Previous Hole size below previous shoe	17.50	in

Running String Data

Running String 1 Length	1.84	m
Running String 1 ID	8.78	in
Running String 2 Length	0.00	m
Running String 2 ID	0.00	in
Stick-up above RT	1.84	m
Stinger Length	0.00	m
Stinger ID	0.00	in

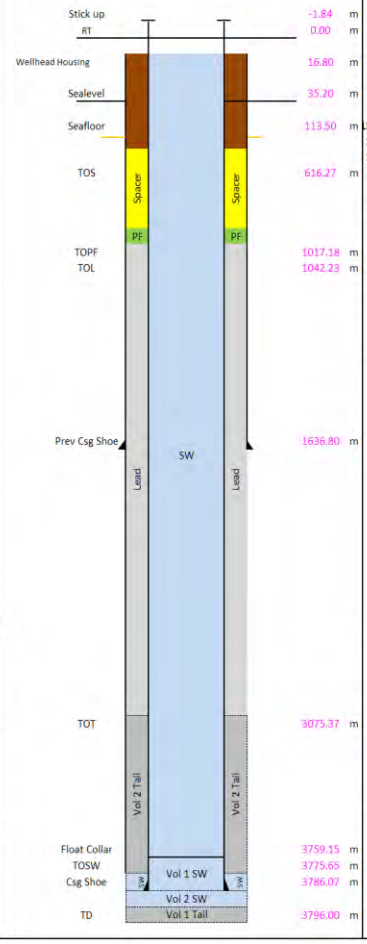
Cement Data

Length of Lead in cased hole	50.00	m
Length of Lead in 17 1/2" cased hole	7.20	m
Length of Lead in OH	1599.27	m
Length of Tail	550.00	m

Notes and Assumptions

Texts in BLACK: EW verified input data as per EV0000028.
Texts in Red: Refer to Table 3 in Vol 2 of the the Expert Witness Response to NOSPA Issues 1 to 9 - Montara H1-ST1 Blowout.
Texts in PINK: EW calculated data.
Texts in GREEN: Refer to Table 3 in Vol 2 of the the Expert Witness Response to NOSPA Issues 1 to 9 - Montara H1-ST1 Blowout.
No losses have been assumed for these calculations as reported in the Dail Mud Reported dated 07/03/09 "EV0000034".
The EW has assumed a 0% hole excess for the 12 1/4" Open hole, based on the calculations used to achieve the reported cementing differential pressure of 1200 psi as stated in NOPSA's "Assumed Facts".

EW Verified Schematic



EW Calculated Values

Cement Calculations

Capacities	bbls/ft	bbls/m
Running String 1	0.075	0.246
Running String 2	Nil	Nil
Stinger	Nil	Nil
Casing 1	0.075	0.246
Casing 2	Nil	Nil
Casing 3	Nil	Nil
13 3/8" Casing x 9 5/8" Casing	0.061	0.200
12 1/4" OH x 9 5/8" Casing	0.056	0.183
17 1/2" OH x 9 5/8" Casing	0.208	0.681
Rathole	0.146	0.478

SW Calculated Volumes	
Vol 1 SW (bbls)	6.61
Vol 2 SW (bbls)	0.48
Vol 1 TAIL (bbls)	4.27
Vol 2 TAIL (bbls)	128.16
LEAD Vol No OH Xces	263.27
LEAD Vol Abv 13 3/8" shoe	118.65

Open Hole Excess	0%

Phase 11: End of Waiting on Cement

	bbl	MD height in annulus (m)	Start MD (m)	End MD (m)	Start TVD (m)	End TVD (m)	TVD height (m)
Remaining Mud Vol	131.98	616.27	616.27	0.00	660.63	0.00	660.63
Spacer Vol	80.00	400.90	1017.18	616.27	1014.93	615.71	399.22
Pre Flush Vol	5.00	25.06	1042.23	1017.18	1039.89	1014.93	24.97
Lead Slurry Vol	381.92	2033.13	3075.37	1042.23	2622	1040	1581.83
Tail Slurry Volume	132.43	700.28	3775.65	3075.37	2653.01	2621.72	31.29

Pore Pressure @ TD

Fluid	Fluid Density (ppg)	Pressure Gradient (psi/ft)	Hydrostatic Pressure of fluid Column (psi)
Hydrocarbon	8.83	0.459	3997

BHP @ TD due to Wet Shoe

Fluid	Fluid Density (ppg)	Pressure Gradient (psi/ft)	Hydrostatic Pressure of fluid Column (psi)
SW	8.66	0.450	3921.274
Total Pressure (psi)			3921

Cementing Calculation Worksheet Description

This worksheet presents the calculation of static Bottom Hole Pressure (BHP) at the FINAL WELL DEPTH after the Waiting on Cement (WOC) period, by which time the tail and lead had solidified into a cement sheath, thereby preventing a transmission of fluid hydrostatic pressure in the annulus.
This worksheet is the eleventh (11th) of twelve (12) worksheets, and shows that as a result of the cement hardening process, the only means of hydraulic pressure transmission to the Montara Cycle IV Reservoir, is now effected solely through the Sea Water column within the internal 9 5/8" (244mm) casing.

5.13 Pseudo Static Equivalent Annulus BHP after Installation of 9 5/8" PCCC

SW ISO Doc Ref No:	XLS-30291-NOPSA-003-9 5/8" Cmt Calcs 12
Prepared by:	SEAN FOO / YEO MIN
Reviewed & Approved by:	COLIN STUART
Date:	16-Feb-12
Rev No:	1

H1-ST1 well, 9 5/8" CSG, Pseudo Static Equivalent Annulus BHP after Installation of 9 5/8" PCCC

EW Verified Input Data from DDR

Well Data

RT	35.20	m
Water Depth	78.30	m
Top Wellhead	16.80	m
Mudline	113.50	m
Previous Casing Shoe	1636.80	m
Hole Size	12.25	in
Section TD	3796.00	m

Casing Data

Casing Shoe At	3786.07	m
Casing Shoe ID	8.78	in
Float Collar At	3759.15	m
Casing 1 Length	3759.15	m
Casing 1 OD	9.63	in
Casing 1 ID	8.78	in
Casing 2 Length	0.00	m
Casing 2 OD	0.00	in
Casing 2 ID	0.00	in
Casing 3 Length	0.00	m
Casing 3 OD	0.00	in
Casing 3 ID	0.00	in
Previous Casing OD	13.38	in
Previous Casing ID	12.46	in
Previous Hole size below previous shoe	17.50	in

Running String Data

Running String 1 Length	1.84	m
Running String 1 ID	8.78	in
Running String 2 Length	0.00	m
Running String 2 ID	0.00	in
Stick-up above RT	1.84	m
Stinger Length	0.00	m
Stinger ID	0.00	in

Cement Data

Length of Lead in cased hole	50.00	m
Length of Lead in 17 1/2" cased hole	7.20	m
Length of Lead in OH	1599.27	m
Length of Tail	550.00	m

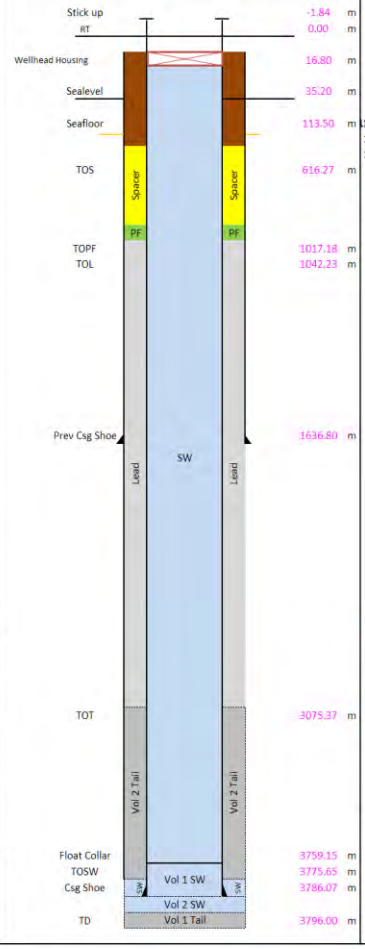
Notes and Assumptions

Texts in BLACK: EW verified input data as per EV0000028.
Texts in Red: Refer to Table 3 in Vol 2 of the the Expert Witness Response to NOSPA Issues 1 to 9 - Montara H1-ST1 Blowout.
Texts in PINK: EW calculated data.
Texts in GREEN: Refer to Table 3 in Vol 2 of the the Expert Witness Response to NOSPA Issues 1 to 9 - Montara H1-ST1 Blowout.

No losses have been assumed for these calculations as reported in the Dail Mud Reported dated 07/03/09 "EV0000034".

The EW has assumed a 0% hole excess for the 12 1/4" Open hole, based on the calculations used to achieve the reported cementing differential pressure of 1200 psi as stated in NOPSA's "Assumed Facts".

EW Verified Schematic



EW Calculated Values

Cement Calculations

Capacities	bbls/ft	bbls/m
Running String 1	0.075	0.246
Running String 2	Nil	Nil
Stinger	Nil	Nil
Casing 1	0.075	0.246
Casing 2	Nil	Nil
Casing 3	Nil	Nil
13 3/8" Casing x 9 5/8" Casing	0.061	0.200
12 1/4" OH x 9 5/8" Casing	0.056	0.183
17 1/2" OH x 9 5/8" Casing	0.208	0.681
Rathole	0.146	0.478

SW Calculated Volumes	
Vol 1 SW (bbls)	6.61
Vol 2 SW (bbls)	0.48
Vol 1 TAIL (bbls)	4.27
Vol 2 TAIL (bbls)	128.16
LEAD Vol No OH Xces	263.27
LEAD Vol Abv 13 3/8" shoe	118.65

Open Hole Excess	0%

Phase 11: End of Stage 1 Suspension - Installation of 9 5/8" TA Cap

	bbl	MD height in annulus (m)	Start MD (m)	End MD (m)	Start TVD (m)	End TVD (m)	TVD height (m)
Remaining Mud Vol	131.98	616.27	616.27	0.00	660.63	0.00	660.63
Spacer Vol	80.00	400.90	1017.18	616.27	1014.93	615.71	399.22
Pre Flush Vol	5.00	25.06	1042.23	1017.18	1039.89	1014.93	24.97
Lead Slurry Vol	381.92	2033.13	3075.37	1042.23	2622	1040	1581.83
Tail Slurry Volume	132.43	700.28	3775.65	3075.37	2653.01	2621.72	31.29

Pore Pressure @ TD

Fluid	Fluid Density (ppg)	Pressure Gradient (psi/ft)	Hydrostatic Pressure of fluid Column (psi)
Oil	8.83	0.459	3997

BHP @ TD due to Wet Shoe

Fluid	Fluid Density (ppg)	Pressure Gradient (psi/ft)	Hydrostatic Pressure of fluid Column (psi)
SW	8.66	0.450	3921
Pressure exerted by 9 5/8" TA Cap			76
Total Pressure (psi)			3997

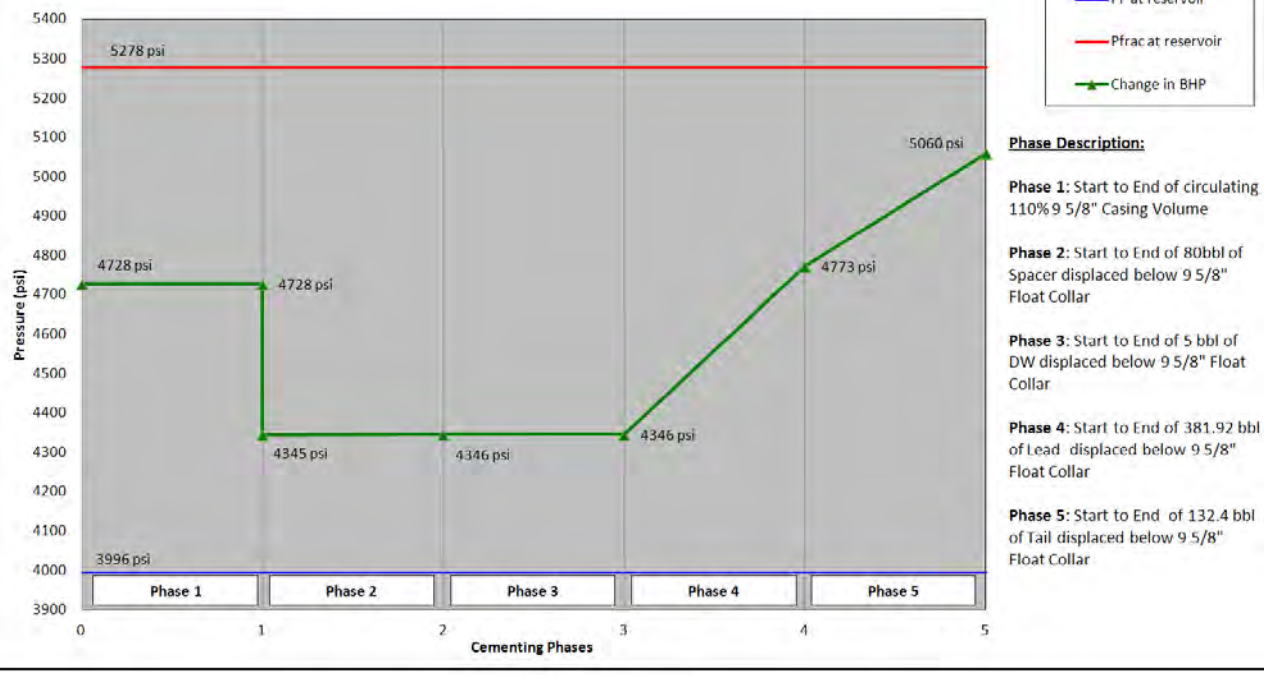
Cementing Calculation Worksheet Description

This worksheet presents the calculation of static Bottom Hole Pressure (BHP) at the FINAL WELL DEPTH after the installation of the 9 5/8" PCCC onto the H1-ST1 Well in fufilment of PTTEPAA's Stage 1 Suspension Plan.
This worksheet is the twelfth (12th) of twelve (12) worksheets, and shows that as a result of the installation of the 9 5/8" PCCC, a surface barrier now exists. In the H1-ST1 Well's current state, the equivalent BHP now equals the Reservoir Pressure of 3997psi at the FINAL WELL DEPTH, as a direct result of the 9 5/8" PCCC providing the additional 76 psi on top of the existing 3921 psi exerted by the SeaWater fluid column to maintain pressure balance against the Reservoir.

5.14 Pseudo Static Equivalent Annulus BHP (Phase 1 to 5)

SW ISO Doc Ref No:	XLS-30291-NOPSA-003 9 5/8" Cmt P1 to 5
Prepared by:	SEAN FOO / YEO MIN
Reviewed & Approved by:	COLIN STUART
Date:	16-Feb-12
Rev No:	1

H1-ST1 well, 9 5/8" CSG, Pseudo Static Equivalent Annulus BHP (Phase 1 to 5)



Phase Description:

Phase 1: Start to End of circulating 110% 9 5/8" Casing Volume

Phase 2: Start to End of 80bbl of Spacer displaced below 9 5/8" Float Collar

Phase 3: Start to End of 5 bbl of DW displaced below 9 5/8" Float Collar

Phase 4: Start to End of 381.92 bbl of Lead displaced below 9 5/8" Float Collar

Phase 5: Start to End of 132.4 bbl of Tail displaced below 9 5/8" Float Collar

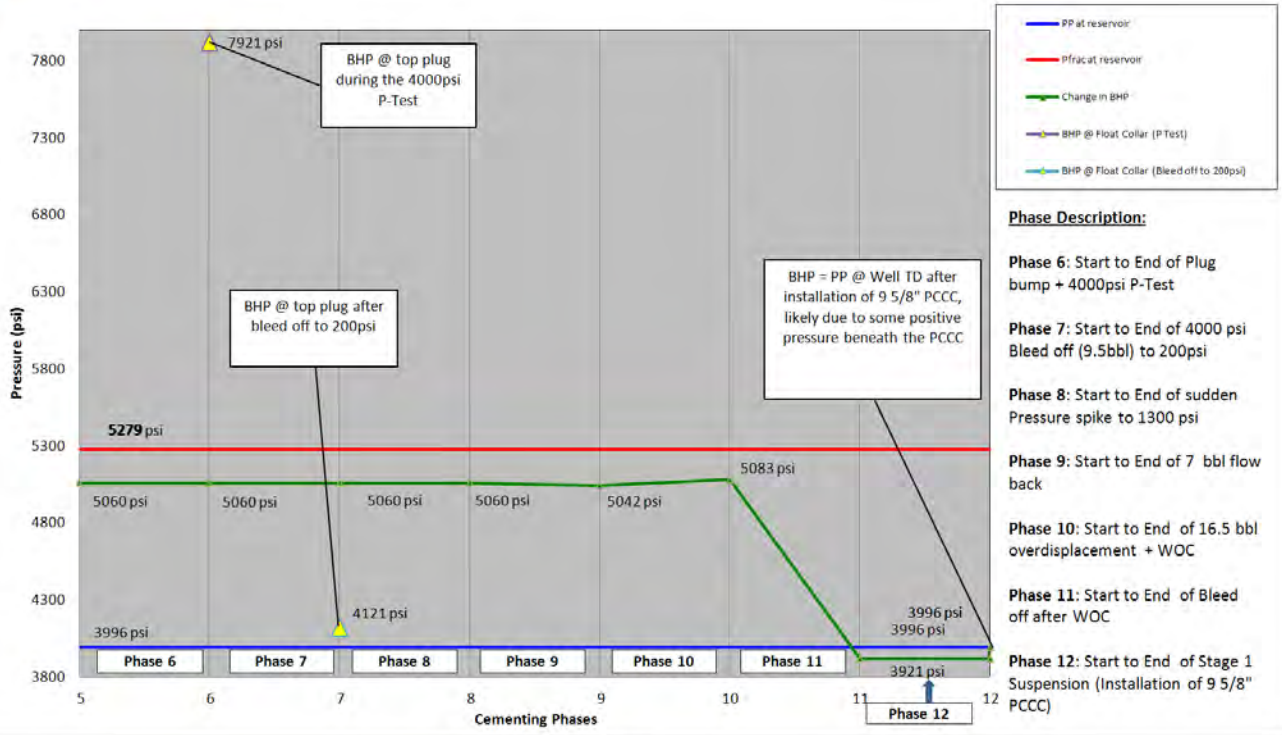
Chart Description

This chart presents the calculated Bottom Hole Pressures (BHP) at the FINAL WELL DEPTH in the annulus, exerted by the hydrostatic pressure(s) of the fluid column(s) during the different phases of the H1-ST1 9 5/8" (244mm) Cementing Operation.
This chart is the first of two charts, and provides an appreciation of how the BHPs is maintained within the Pore Pressure (PP) and Fracture Gradient (FG) boundary from the start of Phase 1 to the end of Phase 5.
The results of calculated BHPs show that from a Well Control perspective, PTTEPAA had used the correct densities and volumes of the Lead and Tail Slurries for the purpose of cementing the H1-ST1 9 5/8" Casing.

5.15 Pseudo Static Equivalent Annulus BHP (Phase 6 to 12)

SW ISO Doc Ref No:	XLS-30291-NOPSA-003 9 5/8" Cmt P6 to 12
Prepared by:	SEAN FOO / YEO MIN
Reviewed & Approved by:	COLIN STUART
Date:	16-Feb-12
Rev No:	1

H1-ST1 well, 9 5/8" CSG, Pseudo Static Equivalent Annulus BHP (Phase 6 to 12)



Phase Description:

Phase 6: Start to End of Plug bump + 4000psi P-Test

Phase 7: Start to End of 4000 psi Bleed off (9.5bbl) to 200psi

Phase 8: Start to End of sudden Pressure spike to 1300 psi

Phase 9: Start to End of 7 bbl flow back

Phase 10: Start to End of 16.5 bbl overdisplacement + WOC

Phase 11: Start to End of Bleed off after WOC

Phase 12: Start to End of Stage 1 Suspension (Installation of 9 5/8" PCCC)

Chart Description

This chart presents the calculated Bottom Hole Pressures (BHP) at the FINAL WELL DEPTH, exerted by the hydrostatic pressure(s) of the fluid column(s) during the different phases of the H1-ST1 9 5/8" (244mm) Cementing Operation.

This chart is the second of two charts, and provides an appreciation of how the BHP is maintained within the Pore Pressure (PP) and Fracture Gradient (FG) margin during the start of Phase 6 to the end of Phase 11.

The calculated BHP from Phase 6 to Phase 11, show from a Well Control perspective, that PTTEPAA had used the correct densities and volumes of the Lead and Tail Slurries for the purpose of cementing the H1-ST1 9 5/8" Casing.

This chart further highlights that the 4000 psi Positive Pressure Test conducted after the Top Plug bump, and subsequent bled off to 200 psi, had no effect on the 9 5/8" (244mm) annulus BHP at the FINAL WELL DEPTH, as a result of the Top Plug isolating the Displacement Fluid from the cement slurries.

However, after Phase 11, the creation of a 'Wet Shoe' due to a 9 bbl overdisplacement (beyond the shoe track volume), resulted in a direct communication between the Montara Cycle IV Reservoir at the FINAL WELL DEPTH with the H1-ST1 Well through the 9 5/8" Casing to surface. A bleed off to zero psi at surface, after the Wait on Cement (WOC) resulted in the BHP being under balance as compared to the Montara Cycle IV Reservoir Pressure.

Despite the small 75 psi underbalance at the FINAL WELL DEPTH after Phase 11, H1-ST1 Well was subsequently brought back to a balance state after the installation of the 9 5/8" PCCC in Phase 12, with (in the Expert Witness's Opinion) a calculated 75 psi pressure trapped under the 9 5/8" PCCC. This pressure would have taken some time to build and is a function of the reservoir mechanical (permeability) and fluid properties. It is entirely possible that in the time period between the bleed off to zero, after Waiting of Cement, and the installation of the PCCC **(4.5h)** that no noticeable flow occurred at surface.

6. Technical Queries from NOPSA

A technical query was sent by NOPSA in an email on the 24 December 2011 to the Expert Witness. This section covers the Expert Witness's response to the technical queries raised. Subsequently, a teleconference call on the 19 February 2012 between NOPSA and the Expert Witness was conducted to further address this issue.

6.1 NOPSA's Technical Queries Email

From: Colin Stuart
Sent: Saturday, December 24, 2011 7:23 AM
To: Damien Cronin
Cc: Sean Foo; Elvin Heng
Subject: RE: Montara Investigation Action Items [SEC=UNCLASSIFIED]

Hello Damien,

Thank you for your note. We will check the respective questions and get back to you in a couple of days. We are still on track at this stage having made a good start. We are using a lot of the techniques developed for our BOEMRE investigation project which will provide a great deal of illumination on the incident, and have already made some key findings.

A very happy Xmas and New year to you and family also.

Regards, Colin

Colin Stuart B.Eng FIMechE

Technical & Managing Director
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E Mail: colin.stuart@stuartwright.com.sg
Web: www.stuartwright.com.sg

From: Damien Cronin [mailto:damien.cronin@nopsa.gov.au]
Sent: Fri 12/23/2011 4:54 PM
To: Colin Stuart
Subject: Montara Investigation Action Items [SEC=UNCLASSIFIED]

Colin,
We have been reviewing our task list items for the Montara Investigation and would like to check the following with you:

1- What should PTTEPAA and Atlas Drilling do with a deviation in drilling program– what is the process?

Based on the information provided to you (procedures, correspondence, records) and your knowledge of the regulatory requirements what would be required of PTTEEPAA if they needed to deviate from there drilling program. What would be required if anything from Atlas Drilling.

2 - Compliance with approval for stages of drilling program

As part of your report can you review the approvals received from the NTDA and cross check the compliance with these approvals in practice.

3 - Check that the expert witness will include in his report pictures of a 9 5/8" and 13 3/8" PCCC

Can you include pictures of 9 5/8" and 13 3/8" PCCC's so the CDPP can see what they actually look like in reality. If they are the 'Vetco Gray' models, all the better.

4 - Check if the Expert Witness was given the schematic of Vetco Gray PCCC's

Can you confirm that you were given a copy of the manufacturers data for the Vetco Gray PCCC's used on the West Atlas. I believe you were provided with the manufacturers specification sheet.

5 - Identify whether the Expert Witness was given a copy of the Schlumberger MWD document (exhibit 118)

Can you confirm that you were provided with a copy of the measurement while drilling report produced by Schlumberger.

6 - BOP on H1ST1 Well – Check DDR's to identify whether BOP in place on H1ST1 well

During your review of the DDR's and other documentation, can you confirm whether the BOP was ever fitted to the H1 or H1ST1 well and if it was, when?

7 - Need to verify if work was done under preliminary approval rather than authorised approval by NT DA

During your review of the documents provided can you identify whether work was done under preliminary approval and followed up with full written approval or not as the case may be.

If I can clarify any of the questions above please let me know.

Are you still on target to finish the report at the end of January 2012.

Hope you have a great Christmas and New Year.

Regards

Damien

Damien Cronin
Investigation Manager
National Offshore Petroleum Safety Authority (NOPSA)
Level 11, 58 Mounts Bay Road
Perth WA 6000
GPO Box 2568 Perth WA 6001
Ph: (08) 6188 8785 Fax: (08) 6188 8737
Email: damien.cronin@nopsa.gov.au
Web: www.nopsa.gov.au

Please Note: NOPSA's head office has relocated. Visit www.nopsa.gov.au for more information.

6.2 Response to Montara Investigation Action Items -23 December 2011 (TQ_30291_ NOPSA_001)

CDPP Question	NOPSA Comments	SWPL Answer
What should PTTEPAA and Atlas Drilling do with a deviation in drilling program– what is the process?	Based on the information provided to you (procedures, correspondence, records) and your knowledge of the regulatory requirements what would be required of PTTEEPAA if they needed to deviate from there drilling program. What would be required if anything from Atlas Drilling.	The **general process** is such that a MOC (Management of Change) document would have to be produced normally by the operator and co-signed by both operator and drilling contractor. The MOC states the deviation requested, needs to explain why the deviation is required, and state that a risk assessment has been conducted and that the risks resulting from the MOC are/can be managed.The inclusion of the drilling contractor authorised signature depends on what has been agreed in any bridging document or possibly stated in the safety case for the drilling rig itself. Specific to PTTEPAA and Atlas Drilling, a bridging document ("EV0000055 Seadrill-West Atlas safety case revision-Document No. HSE SCR WA 070002 Montara SIMOPS Addendum") had been jointly prepared between Atlas Drilling and the PTTEPAA Well Construction department. Part of its preparation includes details on the finalisation, dissemination, implementation and ongoing hazard identification, of risk management and change control. As stated in the Safety Case Revision, the PTTEPAA Well Construction Management System is the agreed system used to plan and execute well construction activities at the Montara WHP as for any other drilling activities. The document PTTEPAA Well Construction Management Framework states that for any change management, the following task should be followed:

		1. **Identify Requirement for Change and Justify** - Complete Change Request complete with justification - Maintain Change Register 2. **Engineer Change** - Engineer change in accordance with the Well Construction Standards - Carry out hazard analysis and risk mitigation in accordance with Risk Management Activity - Prepare programme revision if engineer change 3. **Record and Disseminate Change** - Update the Change Register and e-mail all persons details of the change - Record learning experience in Knowledge Database if applicable (Knowledge Management Activity)
Compliance with approval for stages of drilling program	As part of your report can you review the approvals received from the NTDA and cross check the compliance with these approvals in practice.	This question we find is too open ended. Can NOPSA be more specific?
Check that the expert witness will include in his report pictures of a 9 5/8" and 13 3/8" PCCC	Can you include pictures of 9 5/8" and 13 3/8" PCCC's so the CDPP can see what they actually look like in reality. If they are the 'Vetco Gray' models, all the better.	1. We have 2D cross-sectioned drawings (not drawn to scale) from the "**Vetco Operating and Service Procedure (Vecto Doc no: OSP03001)**". 2. **It should be highlighted that the "Vetco Operating and Service Procedure (Vecto Doc no: OSP03001)" should not be taken as the definitive "final approved Assembly Drawings".**
Check if the Expert Witness was given the schematic of Vetco	Can you confirm that you were given a copy of the manufacturers data for the	1. No manufacturer's specification data of PCCC used on West Atlas was provided to SWPL.

<table>
<tr>
<td>Gray PCCC's</td>
<td>Vetco Gray PCCC's used on the West Atlas. I believe you were provided with the manufacturers specification sheet.</td>
<td>2. Only a document termed "Vetco Operating and Service Procedure Vetco OPS-03001 (Mudline Suspension System Tieback)" were found as a reference document to the PPTEP Montara Phase 1B (Drilling & Completion Program, Rev-0 Jun 2009).

3. NOTE: With Reference to Vetco OPS-03001, the 13-3/8” Corrosion Cap was not designed to be pressure rated. (see below). Thus, it needs to be verified if this specification of corrosion cap (13-
<table>
<tr><td>SIZE</td><td>13-3/8"</td></tr>
<tr><td>PART NUMBER</td><td>143030-1*</td></tr>
<tr><td>SERVICE</td><td>H_2S</td></tr>
<tr><td>MAXIMUM OD</td><td>14.78"</td></tr>
<tr><td>PRESSURE RATING</td><td>N/A</td></tr>
<tr><td>THREAD TYPE</td><td>LEFT HAND - 2 TPI</td></tr>
<tr><td>NUMBER OF TURNS TO MAKE-UP</td><td>7 TO 8</td></tr>
<tr><td>RECOMMENDED MAKE-UP TORQUE</td><td>1500 TO 2500 FT-LBS</td></tr>
</table>
</td>
</tr>
<tr>
<td>Identify whether the Expert Witness was given a copy of the Schlumberger MWD document (exhibit 118)</td>
<td>Can you confirm that you were provided with a copy of the measurement while drilling report produced by Schlumberger.</td>
<td>1. Only the Schlumberger MWD survey for H1-ST1 was provided.

2. SWPL will also require the final approved MWD survey for H1.</td>
</tr>
<tr>
<td>BOP on H1ST1 Well – Check DDR’s to identify whether BOP in place on H1ST1 well</td>
<td>During your review of the DDR's and other documentation, can you confirm whether the BOP was ever fitted to the H1 or H1ST1 well and if it was, when?</td>
<td>1. BOP was fitted on both H1 and H1ST1 while drilling the 12-1/4” hole sections.

2. H1 Well
- BOP was installed on H1 well after 13-3/8” casing cement was set and prepared for drilling the 12-14” hole section. (DDR H1 Report #8 dated 19th Feb</td>
</tr>
</table>

		2009) 3. H1-ST1 well (commenced on 1 Mar 09) - Continuation from H1 and BOP was installed on H1-ST1 until 9-5/8" casing was cemented (7th Mar 2009). - Nipple-down BOP on 8th Mar 09 from H1-ST1 and skidded for H4. (DDR H1-ST1 Report #8, dated 8th Mar 2009). - Installed back BOP onto H1-ST1 for storage on 20 Mar 09. (DDR H4 Report #21, dated 20th Mar 2009). - Removed BOP from H1-ST1 and transferred to H3-ST1 on 3 Apr 09. (DDR H3 ST1 Report #8, dated 3rd Apr 2009)
Need to verify if work was done under preliminary approval rather than authorised approval by NT DA	During your review of the documents provided can you identify whether work was done under preliminary approval and followed up with full written approval or not as the case may be.	1. **Work (1st stage suspension) was done under preliminary approval rather than authorized approval by NT DA.** **Supporting Facts:** **2. 1st stage suspension (cementing & installing 9-5/8" PCCC).** - Application for approval by PTTEP 6th Mar 09 (Ref No: EV0000026) - Preliminary Approval by Dominic Marozzi on 6th Mar 09 (Ref No: EV0000036) - Execution of 1st stage suspension by PTTEP on 7th Mar 09 (Ref No: EV0000552) - Authorized approval from Jerry Whitfield on 9th Mar 09 (Ref No: EV0000036) **3. 2nd stage suspension (installation of 13 3/8" Corrosion Cap and 20" Trash Cap).** - Application for approval by PTTEP 12th Mar 09 (Ref

		No: EV0000038) - Authorized approval from Jerry Whitfield (NTDA) dated 13th Mar 09 (Ref No: EV0000040) - Execution of 2nd stage suspension **(NOTE: Only 20" trash cap installed but not 13 3/8" Corrosion Cap)** by PTTEP on 16th Apr 09 (Ref No: EV0000569)

Table 1: Technical Queries dated 23 December 2011

6.3 Response to Montara Investigation Action Items -19 January 2012 (TQ_30291_ NOPSA_002)

CDPP Question	NOPSA Comments	SWPL Answer
What should PTTEPAA and Atlas Drilling do with a deviation in drilling program– what is the process?	Based on the information provided to you (procedures, correspondence, records) and your knowledge of the regulatory requirements what would be required of PTTEEPAA if they needed to deviate from there drilling program. What would be required if anything from Atlas Drilling.	As per the teleconference call (dated 19 February 2012) between NOPSA and SWPL, SWPL's response to this question had been accepted by NOPSA. No further actions will be required. For reference, the document "**TQ_30291_ NOPSA_001 Response to Montara Investigation Action Items (111223)**" can be referred.
Compliance with approval for stages of drilling program	As part of your report can you review the approvals received from the NTDA and cross check the compliance with these approvals in practice.	As per the teleconference call (dated 19 February 2012) between NOPSA and SWPL, NOPSA explained that the CDPP were interested in the Expert's view on whether PTTEPAA had in actual fact, executed all Wells' activities in accordance to what had been approved by the NT, and whether there was diligence and consistencies applied during the process. In answering CDPP's question 2, SWPL will include in the final report submission, deviations/non-compliances to the approvals received from the NT, as well as deviations from PTTEPAA's own internal MOC as per **section 2 in Volume 3 of the Expert's Report**
Check that the expert witness will include in his report pictures of a 9 5/8" and 13 3/8" PCCC	Can you include pictures of 9 5/8" and 13 3/8" PCCC's so the CDPP can see what they actually look like in reality. If they are the 'Vetco Gray' models, all the better.	As per the teleconference call (dated 19 February 2012) between NOPSA and SWPL, SWPL will include in the report if available, pictures of the 9 5/8" and 13 3/8" PCCC.
Check if the Expert	Can you confirm that you were	As per the teleconference call (dated 19

Witness was given the schematic of Vetco Gray PCCC's	given a copy of the manufacturers data for the Vetco Gray PCCC's used on the West Atlas. I believe you were provided with the manufacturers specification sheet.	February 2012) between NOPSA and SWPL, NOPSA has reponsed that the document "Vetco Operating and Service Procedure Vetco OPS-03001 (Mudline Suspension System Tieback)", attached to the PPTEP Montara Phase 1B (Drilling & Completion Program, Rev-0 Jun 2009), is the only available document to NOPSA regarding the PCCCs' specifications and engineering schematics. For reference, the document "**TQ_30291_ NOPSA_001 Response to Montara Investigation Action Items (111223)**" can be referred.
Identify whether the Expert Witness was given a copy of the Schlumberger MWD document (exhibit 118)	Can you confirm that you were provided with a copy of the measurement while drilling report produced by Schlumberger.	As per the teleconference call (dated 19 February 2012) between NOPSA and SWPL, SWPL acknowledged that we have a copy of the H1-ST1 Schlumberger MWD document (exhibit 118). However, SWPL maintains that we have not received a similar H1 MWD document, but is not a critical document required for the study.
BOP on H1ST1 Well – Check DDR's to identify whether BOP in place on H1ST1 well	During your review of the DDR's and other documentation, can you confirm whether the BOP was ever fitted to the H1 or H1ST1 well and if it was, when?	As per the teleconference call (dated 19 February 2012) between NOPSA and SWPL, SWPL's response to this question had been accepted by NOPSA. No further actions will be required. For reference, the document "**TQ_30291_ NOPSA_001 Response to Montara Investigation Action Items (111223)**" can be referred.
Need to verify if work was done under preliminary approval rather than authorised approval by NT DA	During your review of the documents provided can you identify whether work was done under preliminary approval and followed up with full written approval or not as the case may be.	As per the teleconference call (dated 19 February 2012) between NOPSA and SWPL, SWPL's response to this question had been accepted by NOPSA. No further actions will be required. For reference, the document "**TQ_30291_ NOPSA_001 Response to Montara Investigation Action Items (111223)**" can be referred.

Table 2: Technical Queries dated 19 January 2012

7. Picture of Pressure Containing Corrosion Cap

The figure below is an illustration of examples PCCCs, in response to NOPSA's request via the TQ "Montara Investigation Action Items -19 January 2012 (TQ_30291_ NOPSA_002)".

Figure 3: Picture of Example PCCCs in response to NOPSA's request

8. Appendix

Appendix A: Qualifications of Mr Colin Stuart

Appendix B: Document List Register

Appendix A: Qualifications of Mr Colin Stuart B.Eng FIMechE

1 of 5: Bachelor of Engineer B.Eng, Awarded Liverpool University 1979

2 of 5: Fellow of the Institute of Mechanical Engineers FIMechE, Awarded July 1997

3 of 5: 25 Year member of Society of Petroleum Engineers S.P.E

4 of 5: Managing & Technical Director of Stuart Wright Pte Ltd Singapore, Leading Energy Industry Consultants, Established 2006

5 of 5: Curriculum Vitae Attached

CURRICULUM VITAE

Name:	Colin Stuart, B.Eng. FIMechE
Gender:	Male
Company:	Stuart Wright Pte Ltd
Job Position:	Managing and Technical Director (Founder)

PROFILE:

Well Control Engineering Well Control kick support/remediation/engineering and root cause analysis. Have worked on remote support or in client offices or on site as situation demands.
Well Design, ERD optimization, casing design, drill string analysis, cement job planning, well control, and smart completions.
Drilling operations has included well design verification, daily operations supervision, performance monitoring and improvement.
Management of one well to multi-well drilling operations, offshore drilling supervision, created and managed 90 man well engineering department for major drilling contractor.
Experience in Petroleum Engineering has included PanOil Pan Gas well test analysis package user, well test job planning, completions design, completions procurement, subsea well planning and operations, rig site testing and completions supervision, reservoir equity studies.
Training has included basic and advanced drilling engineering; basic and advanced petroleum engineering, risk management; HPHT well planning and well control.
Computing skills have included being a trainer for DSP Well Engineering software, Word/Excel/PPT etc. Skilled Wellplan and Stresscheck/Wellcat user.
Published Author: SPE Paper Summaries including:

- "20,000 PSI Dual Well Control Systems"
- "A 20 K Well Planning and Operations Experience"
- "Training Well Engineers in the Outsourced Era"
- "Contracting in the Outsourced Era"

SPE Forum Co-Chair 2004 "Completions 2007 and Beyond"
Fellow of the Institute of Mechanical Engineers
Teaching: Casing Design Theory and Computer apps. Hydraulics Theory and computer apps. Introduction to Well Engineering/well planning; HPHT well design; HPHT rig crew training; HPHT rig capability audits.

LANGUAGES	Native language is English
AVAILIABILITY	Available for entire project duration.
QUALIFICATIONS:	B.Eng (Mechanical), 1979, Liverpool University Chartered Engineer. FIMECHE Fellow of the Institute of Mechanical Engineers

TRAINING:		
	Reservoir Engineering, Amoco,	1985
	Advanced Drilling Engineering OGS,	1982
	Production Optimisation, Amoco	1984
	Drilling Engineering, Preston Moore,	1980
	UKCS Well Control Certificate,	1979 and repeated every two years
	Negotiation skills	2000

	Wellplan/Stresscheck well design software BOSIET	2002/03/04 valid till November 2014
EMPLOYMENT EXPERIENCE:		
October 2006 to present	**MANAGING AND TECHNICAL DIRECTOR - Stuart Wright Pte Ltd (Singapore)** - Established a Well Design and Risk Management company in Singapore, focusing on „upfront conceptual through to detailed well design services" for SE Asia, and supporting clients in either high risk drilling or well related production High Risk operations. - Employment/company development is focused on recruitment and training of local Mechanical/Marine/Chemical Engineering graduates in Oil & Gas well design and Risk Management support roles. Training incorporates a practical experience period offshore on a partner drilling rig. Well designs are mapped through proprietary Business Process Mapping technique, which facilitate an extremely fast learning curve for graduates. - Specialising in well control support/Risk management & Training/complex well design including HPHT, and well recovery operations, training, and rig capability auditing, also secondment of personnel in ops engineer roles.	
October 2005 to September 2006	**WELL DESIGN ENGINEER - John Wright Co (Singapore)** - Working for John Wright well control, Singapore, designing intersection well projects, primarily for Shell in Brunei. Projects include working on the design of the novel Conductor Connector well concept, for first trial execution in November 2006, and a relief/abandonment well by intersection. - Planned and executed the abandonment using the relief well method from concept to execution including operations management of rig and all third parties.	
2002- October 2005	**SENIOR ASSET ENGINEER BRUNEI/DEPUTY PROJECT LEADER - Shell (Brunei)** - Working on front end well design for Champion West Phase 2. ERD wells with „Smart" completions. Integral part of subsurface and drilling teams. Drilled 5 complex snake/ERD wells in multiple stacked reservoirs with digital hydraulics smart completions c/w selective drawdown capability along 3.5 km horizontals. - Skilled in Stresscheck/Wellplan/Wellcat/Peak Probabilistic software. Developed deterministic well cost software for Brunei Shell & resource planning system. - Conducted well design and received budget approvals for phase 3 Champion West ERD Oil wells, plus high Pressure Gas wells. Special tasks included lead role in a serious well control incident recovery exercise, and the recovery of a slumped splitter wellhead, resulting in the saving of a $20 mm smart completion oil producer.	
2000 – 2002	**WELL ENGINEERING TEAM LEADER – Woodside Energy Ltd (Australia)** - Well Engineering Team Leader for the Sunrise Gas project. A $1,000 MM drilling project for which I had conceptual design and budget responsibility. - ERD well designs plus subsea clusters. - Design and conceptual to detailed level planning. Supervised a team of 7 engineers including drilling/completion/costing.	
1998 – 2000	**INTERNATIONAL DRILLING CONSULTANT – Kelly Down Consultants (Australia)** - Worked on Various Assignments planning and site supervision in the UK/ New Caledonia. /Papua New Guinea/New Zealand and Australia. - Well design/ equipment and rig procurement. Programme preparation and drilling superintendent duties. Also wrote and supervised well tests on several wild cat wells.	
1998	**ASSISTANT GENERAL MANAGER AND CONSULTANT WELL ENGINEERING MANAGER –Techdrill North Sea (UK)** - Assisted in establishing well engineering services for a well engineering computer software company, DSP-1 well planning software expert user. Licensed DSP-1 user. - Contract and sales negotiations for Techdrill North Sea	
1994 - 1998	**WELL ENGINEERING MANAGER – Santa Fe Ltd (UK)** - Established and managed the UK Well Engineering Group, providing integrated well construction services, comprising 90 staff after 4 years. Turnover £4 MM per annum.	

- Project Management and incentive drilling. Customers included BP/Shell/Amoco/B.Gas/Amerada Hess

1990 – 1993 **DRILLING SUPERINTENDENT - Ranger Oil Ltd (UK)**
- Planned and managed Southern Northern Sea development drilling programme on the Anglia Field. Template drilling and platform tiebacks.
- Senior Drilling Engineer providing technical support for an HPHT 20 K PSI offshore well including Superintendent cover.
- Superintendent for Subsea development of Anglia West Field. Set up and managed remote base in Gt Yarmouth. Totally responsible for all aspects of supply and operations base management.

1990 **DRILLING OPERATIONS ENGINEER (Consultant) - BP (Southern North Sea)**
- Well planning and daily support for development drilling operations on Amethyst Field. Multiwell deviated gas development.

1989 – 1990 **DRILLING OPERATIONS ENGINEER (Consultant) - Shell Expro (Southern North Sea)**
- Planning for eight well workover operations on Sean Field, Southern North Sea.

1989 **PETROLEUM ENGINEER (Consultant) - British Gas**
- On site Petroleum Engineer supervising slant rig completion and production well testing.

1987 – 1988 **PETROLEUM ENGINEER/WELL OPERATIONS ENGINEER (Staff) - Amoco UK (Yarmouth, UK)**
- Planned and supervised offshore platform well testing, completions, coiled tubing nitrogen operations and production logging. Supervised several offshore DST‟s on exploration jackups.

1983 – 1987 **DRILLING ENGINEER (Staff) - Amoco UK (London, UK)**
- Appraised new discoveries, prepared development recommendations.
- Appraised and evaluated Gas Condensate Fields in North Sea resulting in full field development of Everest Fields.

1981 – 1983 **DRILLING ENGINEER (Staff) - Sohio Alaska Petroleum Co. (Canada)**
- Development Drilling Engineer planning and working in rotation on N. Slope running a seven rig drilling programme as on-site engineer.

1980 – 1981 **DRILLING ENGINEER (Staff) - BP Petroleum (Aberdeen, Scotland)**
- Development drilling and well workover programmes for Forties Field, including on site engineering supervision.

1980 **DRILLING ENGINEER (Staff) – BP (Norway)**
- Offshore semi-submersible exploration programme.
- Supported operations onshore and worked rig-site as Offshore Engineer.

1979 – 1980 **DRILLING ENGINEER IN TRAINING (Staff) - BP Petroleum (Aberdeen, Scotland)**
- Spent six months training in roughneck position on Forties drilling rigs.
- Received training in drilling engineering techniques during onshore assignments.

Appendix B: Document List Register

Stuart Wright Pte Ltd

Document Number Register

S/No.	Document No.	Pg	Document Title	NOPSA Tag No.	Date Recvd & File
	CLIENT DOCUMENTS - INPUTS				
1	DB-30291-NOPSA-001		Seadrill West Atlas Safety Case	EV0000006	29/9/11 File 1
2	DB-30291-NOPSA-002		Coogee Resources-Montara Development-Safety Case For Construction And Instalaltion	EV0000008	29/9/11 File 2
3	DB-30291-NOPSA-003		Coogee Resources-Montara Development-SIMOPS Plan	EV0000009	29/9/11 File 2
4	DB-30291-NOPSA-004		Coogee Resources-Montara Development-Construction & Installation Safety Case/WHP Hookup &	EV0000010	29/9/11 File 2
5	DB-30291-NOPSA-005		Coogee Resources-Montara Development-Basis Of Well Design-Montara-H1	EV0000073	29/9/11 File 2
6	DB-30291-NOPSA-006		Coogee Resources-GI, H1 & H4 (Batch Drilled) Drilling Program	EV0000011	29/9/11 File 2
7	DB-30291-NOPSA-007		Coogee Resources-Montara H1-Well Operations Management Plan (WOMP)	EV0000012	29/9/11 File 2
8	DB-30291-NOPSA-008		Coogee Resources-GI, H1 & H4 (Batch Drilled) Drilling Program REV:2 (same as item 50)	EV0000018	29/9/11 File 2
9	DB-30291-NOPSA-009		Coogee Resources-GI, H1 & H4-AC/L7-Revised Drilling Program	EV0000013	29/9/11 File 2
10	DB-30291-NOPSA-010		Coogee Resources-GI, H1 & H4-AC/L7-Revised Drilling Program	EV0000014	29/9/11 File 2
11	DB-30291-NOPSA-011		Coogee Resources-Well Construction Change Control Form	EV0000015	29/9/11 File 2
12	DB-30291-NOPSA-012		Coogee Resources-Cementing Program-Montara H1 No Topsides	EV0000016	29/9/11 File 3
13	DB-30291-NOPSA-013		Coogee Resources--Well Construction Change Control Form- Montara H1 & H4- Change Control D65005A 003	EV0000017	29/9/11 File 3
14	DB-30291-NOPSA-014		PTTEP Australasia titled "Montara Platform, Forward Plan #17-Run and Cement 9 5/8" Version:2.0	EV0000033	29/9/11 File 3
15	DB-30291-NOPSA-015		Coogee Resources-Montara H2 & H3 (Batch Drilled) Drilling Program	EV0000803	29/9/11 File 3
16	DB-30291-NOPSA-016		Email from Chris Wilson to West Atlas Supervisor- Application for Approval to sidetrack Montara H1-AC-L7	EV0000020	29/9/11 File 3
17	DB-30291-NOPSA-017		Email from Chris Wilson-Preliminary Copy of Change Control-Montara H1, H4, H2 & H3 & Coogee Resources	EV0000021	29/9/11 File 3
18	DB-30291-NOPSA-018		Letter addressed to Jerry Whitifield from Ian Paton-PTTEP Australasia Pty Ltd	EV0000026	29/9/11 File 3
19	DB-30291-NOPSA-019		Workbook containing 6 worksheets including Coogee Resources	EV0000028	29/9/11 File 3
20	DB-30291-NOPSA-020		PTTEP Australasia titled "Montara Platform, Forward Plan #17-Run and Cement 9 5/8" Version:1.0	EV0000029	29/9/11 File 3
21	DB-30291-NOPSA-021		Excel spreadsheet in the name of PTTEP Australasia & Schlumberger- Montara H1 ST1 MWD Surveys	EV0000030	29/9/11 File 3
22	DB-30291-NOPSA-022		Coogee Resources Advantage Drilling Fluids Report 6 March 2009	EV0000072	29/9/11 File 3
23	DB-30291-NOPSA-023		Organisation Chart-Montara Development Project Chart dated 7 March 2009	EV0000032	29/9/11 File 3
24	DB-30291-NOPSA-024		Montara H1-ST1 Forward Plan #17-Run & Cement 9 5/8 Casing 7 March 09 Version 2.0	EV0000033	29/9/11 File 3
25	DB-30291-NOPSA-025		Email from West Atlas Drilling Supervisor to Craig Duncan and Chris Wilson-Montara WHP Morning Reports	EV0000034	29/9/11 File 3
26	DB-30291-NOPSA-026		Email from Dominic Marozzi to Ian Paton from Jerry Whitifield-Application for Approval to Suspend Montara H1ST1 Development Well AC/L7	EV0000036	29/9/11 File 3
27	~~DB-30291-NOPSA-027~~				
28	DB-30291-NOPSA-028		Letter addressed to Mr Jerry Whitifield frim Ian Paton, PTTEP Australasia Pty Ltd-	EV0000038	29/9/11 File 3
29	DB-30291-NOPSA-029		Management Standards: PTTEP Australasia-Construct, Service or Abandon Well Process	EV0000039	29/9/11 File 3
30	DB-30291-NOPSA-030		Email addressed to Ian Paton from Jerry Whitifield-Approval to Suspend Montara H4 & perform Stage 2	EV0000040	29/9/11 File 3
31	~~DB-30291-NOPSA-031~~				
32	DB-30291-NOPSA-032		Email-West Atlas Drilling Supervisor to Duncan, Craig, Wilson Chris- 2009/04/15 Montata WHP Reports	EV0000044	29/9/11 File 3
33	DB-30291-NOPSA-033		Email-West Atlas Drilling Supervisor to Duncan, Craig, Wilson Chris- 2009/04/16 Montata WHP Reports	EV0000048	29/9/11 File 3
34	DB-30291-NOPSA-034		Montara Development Construction and Installation Safety Case for the WHP & Subsea Installation	EV0000049	29/9/11 File 3
35	DB-30291-NOPSA-035		PTTEPAA Management Standard: Well Construction Manegement Framework Standard ID	EV0000050	29/9/11 File 4
36	DB-30291-NOPSA-036		PTTEP Australasia Pty Ltd-Montara Development Project-Montara Phase1B Drilling & Completion Program	EV0000051	29/9/11 File 4
37	DB-30291-NOPSA-037		Document-PTTEP Australasia-Well Construction Standards, Standard ID: D41-502433-FACCOM Version 3	EV0000096	29/9/11 File 4
38	DB-30291-NOPSA-038		15 Page document PTTEP Organisation Charts 1 August 2009	EV0000054	29/9/11 File 4
39	DB-30291-NOPSA-039		Seadrill-West Atlas safety case revision-Document No. HSE SCR WA 070002 Montara SIMOPS Addendum	EV0000055	29/9/11 File 4
40	DB-30291-NOPSA-040		Email: Re Schedule Update West Alias from Attachment- 18/08/2009 & 21/08/2009-Email related to to the conduct of drilling operations on the Montara H1-ST1	EV0000056	29/9/11 File 4
41	DB-30291-NOPSA-041		e-Document-PTTEP Australasia-Montara platform, Forward plan #1b-20 Tie back 19th Aug 09-PTTEP SCR	EV0000058	29/9/11 File 4
42	DB-30291-NOPSA-042		e-Document-email from Chris Wilson to West Atlas (Paul O'SHEA) dated 19 Aug 2009-PTTEP scr	EV0000059	29/9/11 File 4
43	~~DB-30291-NOPSA-043~~				
44	DB-30291-NOPSA-044		e-Document-List of Personnel Onboard West Atlas MDOU between 20 Aug 2009 and 21 Aug 2009	EV0000062	29/9/11 File 4
45	DB-30291-NOPSA-045		Certified 11 page document- Java Constructor Daily Progress Report-Project No. 12090-P/N: Montara	EV0000065	29/9/11 File 4
46	DB-30291-NOPSA-046		Log-Tower Log for 'Java Constructor' dated 21 Aug 2009-pages numbered 87-91 incs-certified	EV0000066	29/9/11 File 4
47	DB-30291-NOPSA-047		Coogee Resources-Montara H2 & H3(Batch Drilled) Document Drilling	EV0000615	29/9/11 File 5
48	DB-30291-NOPSA-048		Montara Phase 1B-Drilling & Completion Program	EV0000799	29/9/11 File 5
49	DB-30291-NOPSA-049		Montara- Well GI, H1, H4 Rev. 0	EV0000613	29/9/11 File 6
50	DB-30291-NOPSA-050		Montara- Well GI, H1, H4 Rev. 2	EV0000614	29/9/11 File 6
51	DB-30291-NOPSA-051		Montara-Well H1-001	EV0000800	29/9/11 File 6
52	DB-30291-NOPSA-052		Montara- Well H1, H4	EV0000801	29/9/11 File 6
53	DB-30291-NOPSA-053		Montara- HI-006	EV0000802	29/9/11 File 6
54	DB-30291-NOPSA-054		Montara-G1 (15/01/09)	EV0000720	29/9/11 File 7
55	DB-30291-NOPSA-055		Montara -G1 (17/01/09)	EV0000721	29/9/11 File 7
56	DB-30291-NOPSA-056		Montara-G1 (30/01/09)	EV0000722	29/9/11 File 7

57	DB-30291-NOPSA-057		Montara-G1 (01/02/09)	EV0000723	29/9/11 File 7
58	DB-30291-NOPSA-058		Montara-G1 (01/02/09)	EV0000724	29/9/11 File 7
59	DB-30291-NOPSA-059		Montara-G1 (03/02/09)	EV0000725	29/9/11 File 7
60	DB-30291-NOPSA-060		Montara-G1 (04/02/09)	EV0000726	29/9/11 File 7
61	DB-30291-NOPSA-061		Montara-G1 (04/02/09)	EV0000727	29/9/11 File 7
62	DB-30291-NOPSA-062		Montara-G1 ST1 (05/02/09)	EV0000728	29/9/11 File 7
63	DB-30291-NOPSA-063		Montara-G1 ST1 (05/02/09)	EV0000729	29/9/11 File 7
64	DB-30291-NOPSA-064		Montara-G1 ST1 (05/02/09)	EV0000730	29/9/11 File 7
65	DB-30291-NOPSA-065		Montara-G1 ST1 (06/02/09)	EV0000731	29/9/11 File 7
66	DB-30291-NOPSA-066		Montara-G1 ST1 (08/02/09)	EV0000732	29/9/11 File 7
67	DB-30291-NOPSA-067		Montara-G1 ST1 (10/02/09)	EV0000733	29/9/11 File 7
68	DB-30291-NOPSA-068		Montara-G1 ST1 (11/02/09)	EV0000734	29/9/11 File 7
69	DB-30291-NOPSA-069		Montara-G1 ST1 (12/02/09)	EV0000735	29/9/11 File 7
70	DB-30291-NOPSA-070		Montara-G1 ST1 (14/02/09)	EV0000736	29/9/11 File 7
71	DB-30291-NOPSA-071		Montara-G1 ST1 (17/02/09)	EV0000737	29/9/11 File 7
72	DB-30291-NOPSA-072		Montara-H1 (9/01/09)	EV0000738	29/9/11 File 7
73	DB-30291-NOPSA-073		Montara-H1 (18/01/09)	EV0000739	29/9/11 File 7
74	DB-30291-NOPSA-074		Montara-H1 (19/01/09)	EV0000740	29/9/11 File 7
75	DB-30291-NOPSA-075		Montara-H1 (26/01/09)	EV0000741	29/9/11 File 7
76	DB-30291-NOPSA-076		Montara-H1 (29/01/09)	EV0000742	29/9/11 File 7
77	DB-30291-NOPSA-077		Montara-H1 (29/01/09)	EV0000743	29/9/11 File 7
78	DB-30291-NOPSA-078		Montara-H1 (19/02/09)	EV0000744	29/9/11 File 7
79	DB-30291-NOPSA-079		Montara-H1 (21/02/09)	EV0000745	29/9/11 File 7
80	DB-30291-NOPSA-080		Montara-H1 (22/02/09)	EV0000746	29/9/11 File 7
81	DB-30291-NOPSA-081		Montara-H1 (23/02/09)	EV0000747	29/9/11 File 7
82	DB-30291-NOPSA-082		Montara-H1 (26/02/09)	EV0000748	29/9/11 File 7
83	DB-30291-NOPSA-083		Montara-H1 (27/02/09)	EV0000749	29/9/11 File 7
84	DB-30291-NOPSA-084		Montara-H1 (27/02/09)	EV0000750	29/9/11 File 7
85	DB-30291-NOPSA-085		Montara-H1 (01/03/09)	EV0000751	29/9/11 File 7
86	DB-30291-NOPSA-086		Montara-H1 ST-1 (01/03/09)	EV0000752	29/9/11 File 7
87	DB-30291-NOPSA-087		Montara-H1 ST-1 (03/03/09)	EV0000753	29/9/11 File 7
88	DB-30291-NOPSA-088		Montara-H1 ST-1 (05/03/09)	EV0000754	29/9/11 File 7
89	DB-30291-NOPSA-089		Montara-H1 ST-1 (06/03/09)	EV0000755	29/9/11 File 7
90	DB-30291-NOPSA-090		Montara-H1 ST-1 (07/03/09)	EV0000756	29/9/11 File 7
91	DB-30291-NOPSA-091		Montara-H1 ST-1 (17/08/09)-Email + doco	EV0000757	29/9/11 File 7
92	DB-30291-NOPSA-092		Montara-H1 ST-1 (20/08/09)	EV0000758	29/9/11 File 7
93	DB-30291-NOPSA-093		Montara-H2 (20/03/09)	EV0000759	29/9/11 File 7
94	DB-30291-NOPSA-094		Montara-H2 (21/03/09)	EV0000760	29/9/11 File 7
95	DB-30291-NOPSA-095		Montara-H2 (21/03/09)	EV0000761	29/9/11 File 7
96	DB-30291-NOPSA-096		Montara-H2 (30/03/09)	EV0000762	29/9/11 File 7
97	DB-30291-NOPSA-097		Montara-H2 (01/04/09)	EV0000763	29/9/11 File 7
98	DB-30291-NOPSA-098		Montara-H2 (01/04/09)	EV0000764	29/9/11 File 7
99	DB-30291-NOPSA-099		Montara-H2 (02/04/09)	EV0000765	29/9/11 File 7
100	DB-30291-NOPSA-100		Montara-H2 (03/04/09)	EV0000766	29/9/11 File 7
101	DB-30291-NOPSA-101		Montara-H2 (10/04/09)	EV0000767	29/9/11 File 7
102	DB-30291-NOPSA-102		Montara-H2 (12/04/09)	EV0000768	29/9/11 File 7
103	DB-30291-NOPSA-103		Montara-H2 (12/04/09)	EV0000769	29/9/11 File 7
104	DB-30291-NOPSA-104		Montara-H2 (16/04/09)	EV0000770	29/9/11 File 7
105	DB-30291-NOPSA-105		Montara-H2 (17/04/09)	EV0000771	29/9/11 File 7
106	DB-30291-NOPSA-106		Montara-H2 (18/04/09)	EV0000772	29/9/11 File 7
107	DB-30291-NOPSA-107		Montara-H3 (21/03/09)	EV0000773	29/9/11 File 7
108	DB-30291-NOPSA-108		Montara-H3 (22/03/09)	EV0000774	29/9/11 File 7
109	DB-30291-NOPSA-109		Montara-H3 (22/03/09)	EV0000775	29/9/11 File 7
110	DB-30291-NOPSA-110		Montara-H3 (22/03/09)	EV0000776	29/9/11 File 7
111	DB-30291-NOPSA-111		Montara-H3 (24/03/09)	EV0000777	29/9/11 File 7
112	DB-30291-NOPSA-112		Montara-H3-ST1 (24/03/09)	EV0000778	29/9/11 File 7
113	DB-30291-NOPSA-113		Montara-H3-ST1 (25/03/09)	EV0000779	29/9/11 File 7
114	DB-30291-NOPSA-114		Montara-H3-ST1 (26/03/09)	EV0000780	29/9/11 File 7
115	DB-30291-NOPSA-115		Montara-H3-ST1 (28/03/09)	EV0000781	29/9/11 File 7
116	DB-30291-NOPSA-116		Montara-H3-ST1 (04/04/09)	EV0000782	29/9/11 File 7
117	DB-30291-NOPSA-117		Montara-H3-ST1 (08/04/09)	EV0000783	29/9/11 File 7
118	DB-30291-NOPSA-118		Montara-H3-ST1 (21/08/09)	EV0000784	29/9/11 File 7
119	DB-30291-NOPSA-119		Montara-H4 (20/01/09)	EV0000785	29/9/11 File 7
120	DB-30291-NOPSA-120		Montara-H4 (20/01/09)	EV0000786	29/9/11 File 7
121	DB-30291-NOPSA-121		Montara-H4 (20/01/09)	EV0000787	29/9/11 File 7
122	DB-30291-NOPSA-122		Montara-H4 (20/01/09)	EV0000788	29/9/11 File 7
123	DB-30291-NOPSA-123		Montara-H4 (23/01/09)	EV0000789	29/9/11 File 7
124	DB-30291-NOPSA-124		Montara-H4 (24/01/09)	EV0000790	29/9/11 File 7
125	DB-30291-NOPSA-125		Montara-H4 (24/01/09)	EV0000791	29/9/11 File 7
126	DB-30291-NOPSA-126		Montara-H4 (26/01/09)	EV0000792	29/9/11 File 7
127	DB-30291-NOPSA-127		Montara-H4 (08/03/09)	EV0000793	29/9/11 File 7
128	DB-30291-NOPSA-128		Montara-H4 (11/03/09)	EV0000794	29/9/11 File 7
129	DB-30291-NOPSA-129		Montara-H4 (13/03/09)	EV0000795	29/9/11 File 7
130	DB-30291-NOPSA-130		Montara-H4 (15/03/09)	EV0000796	29/9/11 File 7
131	DB-30291-NOPSA-131		Montara-H4 (17/03/09)	EV0000797	29/9/11 File 7

132	DB-30291-NOPSA-132		Montara-H4 (19/03/09)	EV0000798	29/9/11 File 7
133	DB-30291-NOPSA-133		Montara-GI (15/01/09)	EV0000501	29/9/11 File 8
134	DB-30291-NOPSA-134		Montara-GI (16/01/09)	EV0000502	29/9/11 File 8
135	DB-30291-NOPSA-135		Montara-GI (17/01/09)	EV0000503	29/9/11 File 8
136	DB-30291-NOPSA-136		Montara-GI (18/01/09)	EV0000504	29/9/11 File 8
137	DB-30291-NOPSA-137		Montara-GI (30/01/09)	EV0000505	29/9/11 File 8
138	DB-30291-NOPSA-138		Montara-GI (31/01/09)	EV0000506	29/9/11 File 8
139	DB-30291-NOPSA-139		Montara-GI (01/02/09)	EV0000507	29/9/11 File 8
140	DB-30291-NOPSA-140		Montara-GI (02/02/09)	EV0000508	29/9/11 File 8
141	DB-30291-NOPSA-141		Montara-GI (03/02/09)	EV0000509	29/9/11 File 8
142	DB-30291-NOPSA-142		Montara-GI (04/02/09)	EV0000510	29/9/11 File 8
143	DB-30291-NOPSA-143		Montara-GI (05/02/09)	EV0000511	29/9/11 File 8
144	DB-30291-NOPSA-144		Montara-GI-ST1(05/02/09)	EV0000512	29/9/11 File 8
145	DB-30291-NOPSA-145		Montara-GI-ST1(06/02/09)	EV0000513	29/9/11 File 8
146	DB-30291-NOPSA-146		Montara-GI-ST1(07/02/09)	EV0000514	29/9/11 File 8
147	DB-30291-NOPSA-147		Montara-GI-ST1(08/02/09)	EV0000515	29/9/11 File 8
148	DB-30291-NOPSA-148		Montara-GI-ST1(09/02/09)	EV0000516	29/9/11 File 8
149	DB-30291-NOPSA-149		Montara-GI-ST1(10/02/09)	EV0000517	29/9/11 File 8
150	DB-30291-NOPSA-150		Montara-GI-ST1(11/02/09)	EV0000518	29/9/11 File 8
151	DB-30291-NOPSA-151		Montara-GI-ST1(12/02/09)	EV0000519	29/9/11 File 8
152	DB-30291-NOPSA-152		Montara-GI-ST1(13/02/09)	EV0000520	29/9/11 File 8
153	DB-30291-NOPSA-153		Montara-GI-ST1(14/02/09)	EV0000521	29/9/11 File 8
154	DB-30291-NOPSA-154		Montara-GI-ST1(15/02/09)	EV0000522	29/9/11 File 8
155	DB-30291-NOPSA-155		Montara-GI-ST1(16/02/09)	EV0000523	29/9/11 File 8
156	DB-30291-NOPSA-156		Montara-GI-ST1(17/02/09)	EV0000524	29/9/11 File 8
157	DB-30291-NOPSA-157		Montara-GI-ST1(18/02/09)	EV0000525	29/9/11 File 8
158	DB-30291-NOPSA-158		Montara-GI-ST1(19/02/09)	EV0000526	29/9/11 File 8
159	DB-30291-NOPSA-159		Montara-GI-ST1(20/02/09)	EV0000527	29/9/11 File 8
160	DB-30291-NOPSA-160		Montara-H1 (18/01/09)	EV0000528	29/9/11 File 8
161	DB-30291-NOPSA-161		Montara-H1 (19/01/09)	EV0000529	29/9/11 File 8
162	DB-30291-NOPSA-162		Montara-H1 (26/01/09)	EV0000530	29/9/11 File 8
163	DB-30291-NOPSA-163		Montara-H1 (27/01/09)	EV0000531	29/9/11 File 8
164	DB-30291-NOPSA-164		Montara-H1 (28/01/09)	EV0000532	29/9/11 File 8
165	DB-30291-NOPSA-165		Montara-H1 (29/01/09)	EV0000533	29/9/11 File 8
166	DB-30291-NOPSA-166		Montara-H1 (30/01/09)	EV0000534	29/9/11 File 8
167	DB-30291-NOPSA-167		Montara-H1 (19/02/09)	EV0000535	29/9/11 File 8
168	DB-30291-NOPSA-168		Montara-H1 (20/02/09)	EV0000536	29/9/11 File 8
169	DB-30291-NOPSA-169		Montara-H1 (21/02/09)	EV0000537	29/9/11 File 8
170	DB-30291-NOPSA-170		Montara-H1 (22/02/09)	EV0000538	29/9/11 File 8
171	DB-30291-NOPSA-171		Montara-H1 (23/02/09)	EV0000539	29/9/11 File 8
172	DB-30291-NOPSA-172		Montara-H1 (24/02/09)	EV0000540	29/9/11 File 8
173	DB-30291-NOPSA-173		Montara-H1 (25/02/09)	EV0000541	29/9/11 File 8
174	DB-30291-NOPSA-174		Montara-H1 (26/02/09)	EV0000542	29/9/11 File 8
175	DB-30291-NOPSA-175		Montara-H1 (27/02/09)	EV0000543	29/9/11 File 8
176	DB-30291-NOPSA-176		Montara-H1 (28/02/09)	EV0000544	29/9/11 File 8
177	DB-30291-NOPSA-177		Montara-H1 (01/03/09)	EV0000545	29/9/11 File 8
178	DB-30291-NOPSA-178		Montara-H1-ST1 (01/03/09)	EV0000546	29/9/11 File 8
179	DB-30291-NOPSA-179		Montara-H1-ST1 (02/03/09)	EV0000547	29/9/11 File 8
180	DB-30291-NOPSA-180		Montara-H1-ST1 (03/03/09)	EV0000548	29/9/11 File 8
181	DB-30291-NOPSA-181		Montara-H1-ST1 (04/03/09)	EV0000549	29/9/11 File 8
182	DB-30291-NOPSA-182		Montara-H1-ST1 (05/03/09)	EV0000550	29/9/11 File 8
183	DB-30291-NOPSA-183		Montara-H1-ST1 (06/03/09)	EV0000551	29/9/11 File 8
184	DB-30291-NOPSA-184		Montara-H1-ST1 (07/03/09)	EV0000552	29/9/11 File 8
185	DB-30291-NOPSA-185		Montara-H1-ST1 (08/03/09)	EV0000553	29/9/11 File 8
186	DB-30291-NOPSA-186		Montara-H1-ST1 (19/08/09)	EV0000554	29/9/11 File 8
187	DB-30291-NOPSA-187		Montara-H1-ST1 (20/08/09)	EV0000555	29/9/11 File 8
188	DB-30291-NOPSA-188		Montara-H2 (20/03/09)	EV0000556	29/9/11 File 8
189	DB-30291-NOPSA-189		Montara-H2 (21/03/09)	EV0000557	29/9/11 File 8
190	DB-30291-NOPSA-190		Montara-H2 (30/03/09)	EV0000558	29/9/11 File 8
191	DB-30291-NOPSA-191		Montara-H2 (31/03/09)	EV0000559	29/9/11 File 8
192	DB-30291-NOPSA-192		Montara-H2 (01/04/09)	EV0000560	29/9/11 File 8
193	DB-30291-NOPSA-193		Montara-H2 (02/04/09)	EV0000561	29/9/11 File 8
194	DB-30291-NOPSA-194		Montara-H2 (03/04/09)	EV0000562	29/9/11 File 8
195	DB-30291-NOPSA-195		Montara-H2 (10/04/09)	EV0000563	29/9/11 File 8
196	DB-30291-NOPSA-196		Montara-H2 (11/04/09)	EV0000564	29/9/11 File 8
197	DB-30291-NOPSA-197		Montara-H2 (12/04/09)	EV0000565	29/9/11 File 8
198	DB-30291-NOPSA-198		Montara-H2 (13/04/09)	EV0000566	29/9/11 File 8
199	DB-30291-NOPSA-199		Montara-H2 (14/04/09)	EV0000567	29/9/11 File 8
200	DB-30291-NOPSA-200		Montara-H2 (15/04/09)	EV0000568	29/9/11 File 8
201	DB-30291-NOPSA-201		Montara-H2 (16/04/09)	EV0000569	29/9/11 File 8
202	DB-30291-NOPSA-202		Montara-H2 (17/04/09)	EV0000570	29/9/11 File 8
203	DB-30291-NOPSA-203		Montara-H2 (18/04/09)	EV0000571	29/9/11 File 8
204	DB-30291-NOPSA-204		Montara-H3 (21/03/09)	EV0000572	29/9/11 File 8
205	DB-30291-NOPSA-205		Montara-H3 (22/03/09)	EV0000573	29/9/11 File 8

206	DB-30291-NOPSA-206		Montara-H3 (23/03/09)	EV0000574	29/9/11 File 8
207	DB-30291-NOPSA-207		Montara-H3 (24/03/09)	EV0000575	29/9/11 File 8
208	DB-30291-NOPSA-208		Montara-H3-ST1 (24/03/09)	EV0000576	29/9/11 File 8
209	DB-30291-NOPSA-209		Montara-H3-ST1 (25/03/09)	EV0000577	29/9/11 File 8
210	DB-30291-NOPSA-210		Montara-H3-ST1 (26/03/09)	EV0000578	29/9/11 File 8
211	DB-30291-NOPSA-211		Montara-H3-ST1 (27/03/09)	EV0000579	29/9/11 File 8
212	DB-30291-NOPSA-212		Montara-H3-ST1 (28/03/09)	EV0000580	29/9/11 File 8
213	DB-30291-NOPSA-213		Montara-H3-ST1 (29/03/09)	EV0000581	29/9/11 File 8
214	DB-30291-NOPSA-214		Montara-H3-ST1 (30/03/09)	EV0000582	29/9/11 File 8
215	DB-30291-NOPSA-215		Montara-H3-ST1 (03/04/09)	EV0000583	29/9/11 File 8
216	DB-30291-NOPSA-216		Montara-H3-ST1 (04/04/09)	EV0000584	29/9/11 File 8
217	DB-30291-NOPSA-217		Montara-H3-ST1 (05/04/09)	EV0000585	29/9/11 File 8
218	DB-30291-NOPSA-218		Montara-H3-ST1 (06/04/09)	EV0000586	29/9/11 File 8
219	DB-30291-NOPSA-219		Montara-H3-ST1 (07/04/09)	EV0000587	29/9/11 File 8
220	DB-30291-NOPSA-220		Montara-H3-ST1 (08/04/09)	EV0000588	29/9/11 File 8
221	DB-30291-NOPSA-221		Montara-H3-ST1 (09/04/09)	EV0000589	29/9/11 File 8
222	DB-30291-NOPSA-222		Montara-H3-ST1 (10/04/09)	EV0000590	29/9/11 File 8
223	DB-30291-NOPSA-223		Montara-H4 (19/01/09)	EV0000591	29/9/11 File 8
224	DB-30291-NOPSA-224		Montara-H4 (20/01/09)	EV0000592	29/9/11 File 8
225	DB-30291-NOPSA-225		Montara-H4 (21/01/09)	EV0000593	29/9/11 File 8
226	DB-30291-NOPSA-226		Montara-H4 (22/01/09)	EV0000594	29/9/11 File 8
227	DB-30291-NOPSA-227		Montara-H4 (23/01/09)	EV0000595	29/9/11 File 8
228	DB-30291-NOPSA-228		Montara-H4 (24/01/09)	EV0000596	29/9/11 File 8
229	DB-30291-NOPSA-229		Montara-H4 (25/01/09)	EV0000597	29/9/11 File 8
230	DB-30291-NOPSA-230		Montara-H4 (26/01/09)	EV0000598	29/9/11 File 8
231	DB-30291-NOPSA-231		Montara-H4 (08/03/09)	EV0000599	29/9/11 File 8
232	DB-30291-NOPSA-232		Montara-H4 (09/03/09)	EV0000600	29/9/11 File 8
233	DB-30291-NOPSA-233		Montara-H4 (10/03/09)	EV0000601	29/9/11 File 8
234	DB-30291-NOPSA-234		Montara-H4 (11/03/09)	EV0000602	29/9/11 File 8
235	DB-30291-NOPSA-235		Montara-H4 (12/03/09)	EV0000603	29/9/11 File 8
236	DB-30291-NOPSA-236		Montara-H4 (13/03/09)	EV0000604	29/9/11 File 8
237	DB-30291-NOPSA-237		Montara-H4 (14/03/09)	EV0000605	29/9/11 File 8
238	DB-30291-NOPSA-238		Montara-H4 (15/03/09)	EV0000606	29/9/11 File 8
239	DB-30291-NOPSA-239		Montara-H4 (16/03/09)	EV0000607	29/9/11 File 8
240	DB-30291-NOPSA-240		Montara-H4 (17/03/09)	EV0000608	29/9/11 File 8
241	DB-30291-NOPSA-241		Montara-H4 (18/03/09)	EV0000609	29/9/11 File 8
242	DB-30291-NOPSA-242		Montara-H4 (19/03/09)	EV0000610	29/9/11 File 8
243	DB-30291-NOPSA-243		Montara-H4 (20/03/09)	EV0000611	29/9/11 File 8
244	DB-30291-NOPSA-244		Montara-H4 (21/08/09)	EV0000612	29/9/11 File 8
245	DB-30291-NOPSA-245		Montara-GI (30/01/09)	EV0000616	29/9/11 File 9
246	DB-30291-NOPSA-246		Montara-GI (01/02/09)	EV0000617	29/9/11 File 9
247	DB-30291-NOPSA-247		Montara-GI (02/02/09)	EV0000618	29/9/11 File 9
248	DB-30291-NOPSA-248		Montara-GI (03/02/09)	EV0000619	29/9/11 File 9
249	DB-30291-NOPSA-249		Montara-GI (04/02/09)	EV0000620	29/9/11 File 9
250	DB-30291-NOPSA-250		Montara-GI (05/02/09)	EV0000621	29/9/11 File 9
251	DB-30291-NOPSA-251		Montara-GI-ST1 (05/02/09)	EV0000622	29/9/11 File 9
252	DB-30291-NOPSA-252		Montara-GI-ST1 (06/02/09)	EV0000623	29/9/11 File 9
253	DB-30291-NOPSA-253		Montara-GI-ST1 (07/02/09)	EV0000624	29/9/11 File 9
254	DB-30291-NOPSA-254		Montara-GI-ST1 (08/02/09)	EV0000625	29/9/11 File 9
255	DB-30291-NOPSA-255		Montara-GI-ST1 (09/02/09)	EV0000626	29/9/11 File 9
256	DB-30291-NOPSA-256		Montara-GI-ST1 (10/02/09)	EV0000627	29/9/11 File 9
257	DB-30291-NOPSA-257		Montara-GI-ST1 (11/02/09)	EV0000628	29/9/11 File 9
258	DB-30291-NOPSA-258		Montara-GI-ST1 (12/02/09)	EV0000629	29/9/11 File 9
259	DB-30291-NOPSA-259		Montara-GI-ST1 (13/02/09)	EV0000630	29/9/11 File 9
260	DB-30291-NOPSA-260		Montara-GI-ST1 (14/02/09)	EV0000631	29/9/11 File 9
261	DB-30291-NOPSA-261		Montara-GI-ST1 (15/02/09)	EV0000632	29/9/11 File 9
262	DB-30291-NOPSA-262		Montara-GI-ST1 (16/02/09)	EV0000633	29/9/11 File 9
263	DB-30291-NOPSA-263		Montara-GI-ST1 (17/02/09)	EV0000634	29/9/11 File 9
264	DB-30291-NOPSA-264		Montara-GI-ST1 (18/02/09)	EV0000635	29/9/11 File 9
265	DB-30291-NOPSA-265		Montara-GI-ST1 (19/02/09)	EV0000636	29/9/11 File 9
266	DB-30291-NOPSA-266		Montara-GI-ST1 (20/02/09) - Daily Drilling Report & email	EV0000637	29/9/11 File 9
267	DB-30291-NOPSA-267		Montara-H1 (26/01/09)	EV0000638	29/9/11 File 9
268	DB-30291-NOPSA-268		Montara-H1 (27/01/09)	EV0000639	29/9/11 File 9
269	DB-30291-NOPSA-269		Montara-H1 (28/01/09)	EV0000640	29/9/11 File 9
270	DB-30291-NOPSA-270		Montara-H1 (29/01/09)	EV0000641	29/9/11 File 9
271	DB-30291-NOPSA-271		Montara-H1 (03/02/09)	EV0000642	29/9/11 File 9
272	DB-30291-NOPSA-272		Montara-H1 (19/02/09)	EV0000643	29/9/11 File 9
273	DB-30291-NOPSA-273		Montara-H1 (20/02/09)	EV0000644	29/9/11 File 9
274	DB-30291-NOPSA-274		Montara-H1 (21/02/09)	EV0000645	29/9/11 File 9
275	DB-30291-NOPSA-275		Montara-H1 (22/02/09)	EV0000646	29/9/11 File 9
276	DB-30291-NOPSA-276		Montara-H1 (23/02/09)	EV0000647	29/9/11 File 9
277	DB-30291-NOPSA-277		Montara-H1 (24/02/09)	EV0000648	29/9/11 File 9
278	DB-30291-NOPSA-278		Montara-H1 (25/02/09)	EV0000649	29/9/11 File 9
279	DB-30291-NOPSA-279		Montara-H1 (26/02/09)	EV0000650	29/9/11 File 9

280	DB-30291-NOPSA-280		Montara-H1 (27/02/09)	EV0000651	29/9/11 File 9
281	DB-30291-NOPSA-281		Montara-H1 (28/02/09)	EV0000652	29/9/11 File 9
282	DB-30291-NOPSA-282		Montara-H1 (01/03/09)	EV0000653	29/9/11 File 9
283	DB-30291-NOPSA-283		Montara-H1 (01/03/09) - Additional info on this report	EV0000654	29/9/11 File 9
284	DB-30291-NOPSA-284		Montara-H1 (07/03/09)	EV0000655	29/9/11 File 9
285	DB-30291-NOPSA-285		Montara-H1 (08/03/09)	EV0000656	29/9/11 File 9
286	DB-30291-NOPSA-286		Montara-H1-ST1 (03/03/09)	EV0000657	29/9/11 File 9
287	DB-30291-NOPSA-287		Montara-H1-ST1 (04/03/09)	EV0000658	29/9/11 File 9
288	DB-30291-NOPSA-288		Montara-H1-ST1 (05/03/09)	EV0000659	29/9/11 File 9
289	DB-30291-NOPSA-289		Montara-H1-ST1 (06/03/09)	EV0000660	29/9/11 File 9
290	DB-30291-NOPSA-290		Montara-H1-ST1 (18/08/09) - Day Drilling Report & email	EV0000661	29/9/11 File 9
291	DB-30291-NOPSA-291		Montara-H1-ST1 (19/08/09) - Day Drilling Report & email	EV0000662	29/9/11 File 9
292	DB-30291-NOPSA-292		Montara-H1-ST1 (20/08/09) - Day Drilling Report	EV0000663	29/9/11 File 9
293	DB-30291-NOPSA-293		Montara-H2 (20/03/09)	EV0000664	29/9/11 File 9
294	DB-30291-NOPSA-294		Montara-H2 (21/03/09)	EV0000665	29/9/11 File 9
295	DB-30291-NOPSA-295		Montara-H2 (30/03/09)	EV0000666	29/9/11 File 9
296	DB-30291-NOPSA-296		Montara-H2 (01/04/09)	EV0000667	29/9/11 File 9
297	DB-30291-NOPSA-297		Montara-H2 (02/04/09)	EV0000668	29/9/11 File 9
298	DB-30291-NOPSA-298		Montara-H2 (03/04/09)	EV0000669	29/9/11 File 9
299	DB-30291-NOPSA-299		Montara-H2 (10/04/09)	EV0000670	29/9/11 File 9
300	DB-30291-NOPSA-300		Montara-H2 (11/04/09)	EV0000671	29/9/11 File 9
301	DB-30291-NOPSA-301		Montara-H2 (12/04/09)	EV0000672	29/9/11 File 9
302	DB-30291-NOPSA-302		Montara-H2 (13/04/09)	EV0000673	29/9/11 File 9
303	DB-30291-NOPSA-303		Montara-H2 (14/04/09)	EV0000674	29/9/11 File 9
304	DB-30291-NOPSA-304		Montara-H2 (15/04/09)	EV0000675	29/9/11 File 9
305	DB-30291-NOPSA-305		Montara-H2 (16/04/09)	EV0000676	29/9/11 File 9
306	DB-30291-NOPSA-306		Montara-H2 (17/04/09)	EV0000677	29/9/11 File 9
307	DB-30291-NOPSA-307		Montara-H2 (18/04/09)	EV0000678	29/9/11 File 9
308	DB-30291-NOPSA-308		Montara-H2 (19/04/09)	EV0000679	29/9/11 File 9
309	DB-30291-NOPSA-309		Montara-H2 (20/04/09)	EV0000680	29/9/11 File 9
310	DB-30291-NOPSA-310		Montara-H3 (21/03/09)	EV0000681	29/9/11 File 10
311	DB-30291-NOPSA-311		Montara-H3 (22/03/09)	EV0000682	29/9/11 File 10
312	DB-30291-NOPSA-312		Montara-H3 (23/03/09)	EV0000683	29/9/11 File 10
313	DB-30291-NOPSA-313		Montara-H3 (24/03/09)	EV0000684	29/9/11 File 10
314	DB-30291-NOPSA-314		Montara-H3-ST1 (24/03/09)	EV0000685	29/9/11 File 10
315	DB-30291-NOPSA-315		Montara-H3-ST1 (25/03/09)	EV0000686	29/9/11 File 10
316	DB-30291-NOPSA-316		Montara-H3-ST1 (26/03/09)	EV0000687	29/9/11 File 10
317	DB-30291-NOPSA-317		Montara-H3-ST1 (27/03/09)	EV0000688	29/9/11 File 10
318	DB-30291-NOPSA-318		Montara-H3-ST1 (28/03/09)	EV0000689	29/9/11 File 10
319	DB-30291-NOPSA-319		Montara-H3-ST1 (29/03/09)	EV0000690	29/9/11 File 10
320	DB-30291-NOPSA-320		Montara-H3-ST1 (30/03/09)	EV0000691	29/9/11 File 10
321	DB-30291-NOPSA-321		Montara-H3-ST1 (03/04/09)	EV0000692	29/9/11 File 10
322	DB-30291-NOPSA-322		Montara-H3-ST1 (04/04/09)	EV0000693	29/9/11 File 10
323	DB-30291-NOPSA-323		Montara-H3-ST1 (05/04/09)	EV0000694	29/9/11 File 10
324	DB-30291-NOPSA-324		Montara-H3-ST1 (06/04/09)	EV0000695	29/9/11 File 10
325	DB-30291-NOPSA-325		Montara-H3-ST1 (07/04/09)	EV0000696	29/9/11 File 10
326	DB-30291-NOPSA-326		Montara-H3-ST1 (08/04/09)	EV0000697	29/9/11 File 10
327	DB-30291-NOPSA-327		Montara-H3-ST1 (09/04/09)	EV0000698	29/9/11 File 10
328	DB-30291-NOPSA-328		Montara-H4 (20/01/09)	EV0000699	29/9/11 File 10
329	DB-30291-NOPSA-329		Montara-H4 (21/01/09)	EV0000700	29/9/11 File 10
330	DB-30291-NOPSA-330		Montara-H4 (22/01/09)	EV0000701	29/9/11 File 10
331	DB-30291-NOPSA-331		Montara-H4 (23/01/09)	EV0000702	29/9/11 File 10
332	DB-30291-NOPSA-332		Montara-H4 (24/01/09)	EV0000703	29/9/11 File 10
333	DB-30291-NOPSA-333		Montara-H4 (25/01/09)	EV0000704	29/9/11 File 10
334	DB-30291-NOPSA-334		Montara-H4 (26/01/09)	EV0000705	29/9/11 File 10
335	DB-30291-NOPSA-335		Montara-H4 (08/03/09)	EV0000706	29/9/11 File 10
336	DB-30291-NOPSA-336		Montara-H4 (09/03/09)	EV0000707	29/9/11 File 10
337	DB-30291-NOPSA-337		Montara-H4 (10/03/09)	EV0000708	29/9/11 File 10
338	DB-30291-NOPSA-338		Montara-H4 (11/03/09)	EV0000709	29/9/11 File 10
339	DB-30291-NOPSA-339		Montara-H4 (12/03/09)	EV0000710	29/9/11 File 10
340	DB-30291-NOPSA-340		Montara-H4 (13/03/09)	EV0000711	29/9/11 File 10
341	DB-30291-NOPSA-341		Montara-H4 (14/03/09)	EV0000712	29/9/11 File 10
342	DB-30291-NOPSA-342		Montara-H4 (15/03/09)	EV0000713	29/9/11 File 10
343	DB-30291-NOPSA-343		Montara-H4 (16/03/09)	EV0000714	29/9/11 File 10
344	DB-30291-NOPSA-344		Montara-H4 (17/03/09)	EV0000715	29/9/11 File 10
345	DB-30291-NOPSA-345		Montara-H4 (18/03/09)	EV0000716	29/9/11 File 10
346	DB-30291-NOPSA-346		Montara-H4 (19/03/09)	EV0000717	29/9/11 File 10
347	DB-30291-NOPSA-347		Montara-H4 (20/03/09)	EV0000718	29/9/11 File 10
348	DB-30291-NOPSA-348		Montara-H4 (21/08/09) - Daily Drilling Report & email	EV0000719	29/9/11 File 10
349	DB-30291-NOPSA-349		Certified Documents Receipt		29/9/11
350	DB-30291-NOPSA-350		Expert Witness Report Requirements		29/9/11
351	DB-30291-NOPSA-351		Assumed Facts - Montara Wellhead Platform		29/9/11
352	DB-30291-NOPSA-352		Acronyms		29/9/11

353	DB-30291-NOPSA-353		Risk Assessment Review		29/9/11
354	DB-30291-NOPSA-354		Submission - 02 - MDP Organisational Chart on 7 March 2009		25/1/12
355	DB-30291-NOPSA-355		Submission - 03a - Resume - Lindsay Wishart - LPM CV		25/1/12
356	DB-30291-NOPSA-356		Submission - 03b - Resume - Noel Treasure Resume cv 2005M 08-2008		25/1/12
357	DB-30291-NOPSA-357		Submission - 06 - Drilling Fluids Programme H1 (no topsides Rev2)		25/1/12
358	DB-30291-NOPSA-358		Submission - 08 - Mud logging data - Montara HI_ST1_Time		25/1/12
359	DB-30291-NOPSA-359		Submission - 09 - Actual TVD of formation tops for H1 ST1 , H4 and GI ST1		25/1/12
360	DB-30291-NOPSA-360		Submission - 12 - Montara Pressure Test Charts for H1 ST1		25/1/12
361	DB-30291-NOPSA-361		Submission - 13 - Montara H1 ST-1 244mm Casing Tally and Report#2		25/1/12
362	DB-30291-NOPSA-362		Submission - 14 - Montara H1 340mm Casing Tally and Report		25/1/12
363	DB-30291-NOPSA-363		Submission - Java Constructor - DPR & Tower Log from Java Constructor		25/1/12
364	DB-30291-NOPSA-364		Submission - PTTEP - Additional Information regarding Oil Spill from West Atlas Rig - 26-08-09		25/1/12
365	DB-30291-NOPSA-365		Submission - PTTEP Document Submission - (MFFDP) - Attachment 1#4		25/1/12
366	DB-30291-NOPSA-366		Submission - PTTEP Document Submission - (MFFDP) - Attachment 2#3		25/1/12
367	DB-30291-NOPSA-367		Submission - PTTEP Document Submission - (MFFDP) - Attachment 3#3		25/1/12
368	DB-30291-NOPSA-368		Submission - PTTEP Document Submission - (MFFDP) - Attachment 4#3		25/1/12
369	DB-30291-NOPSA-369		Submission - PTTEP Document Submission - (MFFDP) - Attachment 5#3		25/1/12
370	DB-30291-NOPSA-370		Submission - PTTEP Document Submission - (MFFDP) - Attachment 6#3		25/1/12
371	DB-30291-NOPSA-371		Submission - PTTEP Document Submission - (MFFDP) - Attachment 7#3		25/1/12
372	DB-30291-NOPSA-372		Submission - PTTEP Document Submission - (MFFDP) - Attachment 8#3		25/1/12
373	DB-30291-NOPSA-373		Submission - PTTEP Document Submission - (MFFDP) - Attachment 9#3		25/1/12
374	DB-30291-NOPSA-374		Submission - PTTEP Document Submission - (MFFDP) - Attachment 10#4		25/1/12
375	DB-30291-NOPSA-375		Submission - PTTEP Document Submission - (MFFDP) - Attachment 11#4		25/1/12
376	DB-30291-NOPSA-376		Submission - PTTEP Document Submission - (MFFDP) - Attachment 12#5		25/1/12
377	DB-30291-NOPSA-377		Submission - PTTEP Document Submission - (MFFDP) - Attachment 13#3		25/1/12
378	DB-30291-NOPSA-378		Submission - PTTEP Document Submission - (MFFDP) - Attachment 14#3		25/1/12
379	DB-30291-NOPSA-379		Submission - PTTEP Document Submission - (MFFDP) - Attachment 15#3		25/1/12
380	DB-30291-NOPSA-380		Submission - PTTEP Document Submission - (MFFDP) - Attachment 16#3		25/1/12
381	DB-30291-NOPSA-381		Submission - PTTEP Document Submission - (MFFDP) - Attachment 17#3		25/1/12
382	DB-30291-NOPSA-382		Submission - PTTEP Document Submission - (MFFDP) - Attachment 18#3		25/1/12
383	DB-30291-NOPSA-383		Submission - PTTEP Document Submission - (MFFDP) - Attachment 19#3		25/1/12
384	DB-30291-NOPSA-384		Submission - PTTEP Document Submission - (MFFDP) - Attachment 20#3		25/1/12
385	DB-30291-NOPSA-385		Submission - PTTEP Document Submission - (MFFDP) - Attachment 21#3		25/1/12
386	DB-30291-NOPSA-386		Submission - PTTEP Document Submission - (MFFDP) Montara Final Field Development Plan#2		25/1/12
387	DB-30291-NOPSA-387		Submission - PTTEP Document Submission - Bundle 1 - Daily Drilling Reports#2		25/1/12
388	DB-30291-NOPSA-388		Submission - PTTEP Document Submission - Bundle 2 - Daily Drilling Reports#2		25/1/12
389	DB-30291-NOPSA-389		Submission - PTTEP Document Submission - Bundle 3 - Daily Drilling Reports#2		25/1/12
390	DB-30291-NOPSA-390		Submission - PTTEP Document Submission - Bundle 4 - Daily Drilling Reports#2		25/1/12
391	DB-30291-NOPSA-391		Submission - PTTEP Document Submission - Bundle 5 - Daily Drilling Reports#2		25/1/12
392	DB-30291-NOPSA-392		Submission - PTTEP Document Submission - Bundle - Suspension Diagrams - As Built#2		25/1/12
393	DB-30291-NOPSA-393		Submission - PTTEP Document Submission - Bundle Well Execution Summaries#2		25/1/12
394	DB-30291-NOPSA-394		Submission - PTTEP Document Submission - Bundle Well survey reports#3		25/1/12
395	DB-30291-NOPSA-395		Submission - PTTEP Document Submission - Drilling & Completion Programme Phase 1B Appendices#3		25/1/12
396	DB-30291-NOPSA-396		Submission - PTTEP Document Submission - Drilling & Completion Programme Phase 1B#3		25/1/12
397	DB-30291-NOPSA-397		Submission - PTTEP Document Submission - Drilling Programme GI, H1 & H4 Rev 0 - Appendices#3		25/1/12
398	DB-30291-NOPSA-398		Submission - PTTEP Document Submission - Drilling Programme GI, H1 & H4 Rev 0#3		25/1/12
399	DB-30291-NOPSA-399		Submission - PTTEP Document Submission - Drilling Programme GI, H1 & H4 Rev 2#3		25/1/12
400	DB-30291-NOPSA-400		Submission - PTTEP Document Submission - Drilling Programme H2 & H3#4		25/1/12
401	DB-30291-NOPSA-401		Submission - PTTEP Document Submission - Management Standard - Construct - Service or Abandon Well Process#4		25/1/12
402	DB-30291-NOPSA-402		Submission - PTTEP Document Submission - Management Standard - Well Construction Management Framework#4		25/1/12
403	DB-30291-NOPSA-403		Submission - PTTEP Document Submission - Management Standard - Well Contruction Standards#3		25/1/12
404	DB-30291-NOPSA-404		Submission - PTTEP Document Submission - Regulatory Approvals#3		25/1/12
405	DB-30291-NOPSA-405		Submission - PTTEP Document Submission - WOMP well GI#3		25/1/12
406	DB-30291-NOPSA-406		Submission - PTTEP Document Submission - WOMP well H1#3		25/1/12
407	DB-30291-NOPSA-407		Submission - PTTEP Document Submission - WOMP well H2#2		25/1/12
408	DB-30291-NOPSA-408		Submission - PTTEP Document Submission - WOMP well H3#2		25/1/12
409	DB-30291-NOPSA-409		Submission - PTTEP Document Submission - WOMP well H4#2		25/1/12
410	DB-30291-NOPSA-410		Submission - Response - Instruction to drillers (ITDs) - 8 March 2009#2		25/1/12
411	DB-30291-NOPSA-411		TM-CR-GEN-E-150-00007 Montara-GI BOD		25/1/12
412	DB-30291-NOPSA-412		TM-CR-GEN-E-150-00008 Montara-H1 BOD		25/1/12
413	DB-30291-NOPSA-413		TM-CR-GEN-E-150-00009 Montara-H4 BOD		25/1/12
414	DB-30291-NOPSA-414		TM-CR-GEN-E-150-00012_0 BOD - Montara-H2		25/1/12
415	DB-30291-NOPSA-415		TM-CR-GEN-E-150-00013_0 BOD - Montara-H3		25/1/12
416	DB-30291-NOPSA-416		Submission - Halliburton Montara H1 cement program version 1		25/1/12
417	DB-30291-NOPSA-417		Submission - Halliburton Montara H1 cement program Ver-2		25/1/12
418	DB-30291-NOPSA-418		Submission - Halliburton Montara H1 cement program Ver-3#2		25/1/12
419	DB-30291-NOPSA-419		Submission - Halliburton Montara H1cement 244mm casing cementing report#2		25/1/12
420	DB-30291-NOPSA-420		Submission - Halliburton P-09-055BB Montara H1 9-58 Lead Cement Lab Report#2		25/1/12
421	DB-30291-NOPSA-421		Submission - Halliburton P-09-056C Montara H1 9-58 Tail Cement Lab Report#2		25/1/12
422	DB-30291-NOPSA-422		Montara H1-ST1 244mm Casing Cementing Calcs		25/1/12
423	DB-30291-NOPSA-423		Montara H1 cem pro Ver-3		25/1/12

424	DB-30291-NOPSA-424		Appendix 4 H1 Cement (original)		25/1/12
425	DB-30291-NOPSA-425		Appendix 4 H1 Cement Rev 1		25/1/12
426	DB-30291-NOPSA-426		Change Control D65005A 001		25/1/12
427	DB-30291-NOPSA-427		Change Control D65005A 001		25/1/12
428	DB-30291-NOPSA-428		APPEND~1		25/1/12
429	DB-30291-NOPSA-429		Change Control D65005A 002		25/1/12
430	DB-30291-NOPSA-430		Change Control D65005A 003		25/1/12
431	DB-30291-NOPSA-431		H1 Cement		25/1/12
432	DB-30291-NOPSA-432		H4 Cement		25/1/12
433	DB-30291-NOPSA-433		Change Control D65005A 005		25/1/12
434	DB-30291-NOPSA-434		Change Control D65005A 006		25/1/12
435	DB-30291-NOPSA-435		MONTAR~2		25/1/12
436	DB-30291-NOPSA-436		Montara H1-ST1 DMR# 01		25/1/12
437	DB-30291-NOPSA-437		Montara H1-ST1 DMR# 02		25/1/12
438	DB-30291-NOPSA-438		Montara H1-ST1 DMR# 03		25/1/12
439	DB-30291-NOPSA-439		Montara H1-ST1 DMR# 04		25/1/12
440	DB-30291-NOPSA-440		Montara H1-ST1 DMR# 05		25/1/12
441	DB-30291-NOPSA-441		Montara H1-ST1 DMR# 06		25/1/12
442	DB-30291-NOPSA-442		Montara H1-ST1 DMR# 07		25/1/12
443	DB-30291-NOPSA-443		Montara H1-ST1 DMR# 08		25/1/12
444	DB-30291-NOPSA-444		Montara-H1 DMR# 01		25/1/12
445	DB-30291-NOPSA-445		Montara-H1 DMR# 02		25/1/12
446	DB-30291-NOPSA-446		Montara-H1 DMR# 03		25/1/12
447	DB-30291-NOPSA-447		Montara-H1 DMR# 04		25/1/12
448	DB-30291-NOPSA-448		Montara-H1 DMR# 05		25/1/12
449	DB-30291-NOPSA-449		Montara-H1 DMR# 06		25/1/12
450	DB-30291-NOPSA-450		Montara-H1 DMR# 07		25/1/12
451	DB-30291-NOPSA-451		Montara-H1 DMR# 08		25/1/12
452	DB-30291-NOPSA-452		Montara-H1 DMR# 09		25/1/12
453	DB-30291-NOPSA-453		Montara-H1 DMR# 10		25/1/12
454	DB-30291-NOPSA-454		Montara-H1 DMR# 11		25/1/12
455	DB-30291-NOPSA-455		Montara-H1 DMR# 12		25/1/12
456	DB-30291-NOPSA-456		Montara-H1 DMR# 13		25/1/12
457	DB-30291-NOPSA-457		Montara-H1 DMR# 14		25/1/12
458	DB-30291-NOPSA-458		Montara-H1 DMR# 15		25/1/12
459	DB-30291-NOPSA-459		Montara-H1 DMR# 16		25/1/12
460	DB-30291-NOPSA-460		Montara-H1 DMR# 17		25/1/12
461	DB-30291-NOPSA-461		Montara-H1 DMR# 18		25/1/12
462	DB-30291-NOPSA-462		09-02-19 DDR 15 Montara GI-ST1		25/1/12
463	DB-30291-NOPSA-463		09-03-20 DDR 21 Montara H4		25/1/12
464	DB-30291-NOPSA-464		Vetco 9.625in MLC Corrosion Cap		25/1/12
465	DB-30291-NOPSA-465		Vetco 13.365in MLC Corrosion Cap		25/1/12
466	DB-30291-NOPSA-466		Coogee Resources Montara GI Lead slurry P-09-031B Rheo		25/1/12
467	DB-30291-NOPSA-467		Coogee Resources Montara GI Tail slurry P-09-032B		25/1/12
468	DB-30291-NOPSA-468		Montara GI cem pro Ver-2		25/1/12
469	DB-30291-NOPSA-469		Montara GI ST1 9.625in Production Csg FARPACK		25/1/12
470	DB-30291-NOPSA-470		Montara GI ST1 13.375in Surface Csg FARPACK		25/1/12
471	DB-30291-NOPSA-471		Montara GI ST1 244mm Casing Cementing Calcs		25/1/12
472	DB-30291-NOPSA-472		Montara GI ST1 340mm Casing Cementing Calcs		25/1/12
473	DB-30291-NOPSA-473		P-09-025A Montara GI 13-38 Lead Cement Lab Report		25/1/12
474	DB-30291-NOPSA-474		P-09-026A Montara GI 13-38 Tail Cement Lab Report		25/1/12
475	DB-30291-NOPSA-475		Chris Wilson - Personal CV Oct 06		25/1/12
476	DB-30291-NOPSA-476		Curriculum Vitaes CND		25/1/12
477	DB-30291-NOPSA-477		Paul O'Shea 2008 resume		25/1/12
478	DB-30291-NOPSA-478		Montara-GI DMR 01		25/1/12
479	DB-30291-NOPSA-479		Montara-GI DMR 02		25/1/12
480	DB-30291-NOPSA-480		Montara-GI DMR 03		25/1/12
481	DB-30291-NOPSA-481		Montara-GI DMR 04		25/1/12
482	DB-30291-NOPSA-482		Montara-GI DMR 05		25/1/12
483	DB-30291-NOPSA-483		Montara-GI DMR 06		25/1/12
484	DB-30291-NOPSA-484		Montara-GI DMR 07		25/1/12
485	DB-30291-NOPSA-485		Montara-GI DMR 08		25/1/12
486	DB-30291-NOPSA-486		Montara-GI DMR 09		25/1/12
487	DB-30291-NOPSA-487		Montara-GI DMR 10		25/1/12
488	DB-30291-NOPSA-488		Montara-GI DMR 11		25/1/12
489	DB-30291-NOPSA-489		Montara-GI ST1 DMR 1		25/1/12
490	DB-30291-NOPSA-490		Montara-GI ST1 DMR 2		25/1/12
491	DB-30291-NOPSA-491		Montara-GI ST1 DMR 3		25/1/12
492	DB-30291-NOPSA-492		Montara-GI ST1 DMR 4		25/1/12
493	DB-30291-NOPSA-493		Montara-GI ST1 DMR 5		25/1/12
494	DB-30291-NOPSA-494		Montara-GI ST1 DMR 6		25/1/12
495	DB-30291-NOPSA-495		Montara-GI ST1 DMR 7		25/1/12
496	DB-30291-NOPSA-496		Montara-GI ST1 DMR 8		25/1/12
497	DB-30291-NOPSA-497		Montara-GI ST1 DMR 9		25/1/12
498	DB-30291-NOPSA-498		Montara-GI ST1 DMR 10		25/1/12

499	DB-30291-NOPSA-499		Montara-GI ST1 DMR 11		25/1/12
500	DB-30291-NOPSA-500		Montara-GI ST1 DMR 12		25/1/12
501	DB-30291-NOPSA-501		Montara-GI ST1 DMR 13		25/1/12
502	DB-30291-NOPSA-502		Montara-GI ST1 DMR 14		25/1/12
503	DB-30291-NOPSA-503		Montara-GI ST1 DMR 15		25/1/12
504	DB-30291-NOPSA-504		Montara mud programme (Wells-GI-H1-H4) - V12		25/1/12
505	DB-30291-NOPSA-505		Fwd Plan 1b Montara H1 ST1 508mm Tie-Back		25/1/12
506	DB-30291-NOPSA-506		Fwd Plan 1b Montara-H1-ST1 508mm Tie-Back supp		25/1/12
507	DB-30291-NOPSA-507		Forward Plan 7 - Montara-H4 Drill 12¼in hole		25/1/12
508	DB-30291-NOPSA-508		Fwd Plan 9 Montara-H2 Drill 12¼in hole - rev2		25/1/12
509	DB-30291-NOPSA-509		Fwd Plan 10A Montara-H2 POOH 12¼in hole Section TD		25/1/12
510	DB-30291-NOPSA-510		Fwd Plan 11 Montara-H2 244mm Casing and cement		25/1/12
511	DB-30291-NOPSA-511		Fwd Plan 12 Montara-H2 244mm Rig Down and Prepare to move		25/1/12
512	DB-30291-NOPSA-512		Fwd Plan 13 Montara-H2 244mm Rig Down and Prepare to move		25/1/12
513	DB-30291-NOPSA-513		Fwd Plan 16 Montara-H1-ST1 At TD and POH		25/1/12
514	DB-30291-NOPSA-514		Fwd Plan 17 Montara-H1-ST1 244mm Casing and cement ver1.0		25/1/12
515	DB-30291-NOPSA-515		Fwd Plan 17 Montara-H1-ST1 244mm Casing and cement ver2.0		25/1/12
516	DB-30291-NOPSA-516		Fwd Plan 18 Montara-H1-ST1 244mm cement		25/1/12
	Deliverables				
1	RPT-30291-NOPSA-001		Report Volume 1		
2	RPT-30291-NOPSA-002		Report Volume 2		
3	RPT-30291-NOPSA-003		Report Volume 3		
4	XLS-30291-NOPSA-001		WAiT©#1 Sheet 1 of 6 WAiT©#1 Sheet 2 of 6 WAiT©#1 Sheet 3 of 6 WAiT©#1 Sheet 4 of 6 WAiT©#1 Sheet 5 of 6 WAiT©#1 Sheet 6 of 6		
5	XLS-30291-NOPSA-002		WAiT©#2 Sheet 1 of 5 WAiT©#2 Sheet 2 of 5 WAiT©#2 Sheet 3 of 5 WAiT©#2 Sheet 4 of 5 WAiT©#2 Sheet 5 of 5		
6	XLS-30291-NOPSA-003		9 5/8" Pre Cement Calculations 9 5/8" Cement Calculations (Phase 1-12) 9 5/8" Cement Graph (Phase 1-5) 9 5/8" Cement Graph (Phase 6-12)		
7	XLS-30291-NOPSA-004		Montara Timeline & Expert Witness Opinions		
	POLICIES				
1	POL-30291-NOPSA-001		Information Security Policy		
	PROJECT REGISTERS				
2	LST-30291-NOPSA-001		Document Control Register		
	Technical Queries				
1	TQ-30291-NOPSA-001		Response to Montara Investigation Action Items (111223) Rev1		
2	TQ-30291-NOPSA-002		Response to Montara Investigation Action Items (120119)		