

**COMMISSION OF INQUIRY  
MONTARA WELL HEAD PLATFORM  
UNCONTROLLED HYDROCARBON RELEASE**

PTTEPAA

GLOSSARY OF TERMS

<b>GLOSSARY OF TERMS</b>	
<b>Term</b>	<b>Definition</b>
<b>Abandonment</b>	Final plugging of a well and/or permanent dismantling of a production platform or other installation.
<b>Add Energy</b>	Hydraulic modelling specialists who assisted ALERT.
<b>As Low As Reasonably Practicable (ALARP)</b>	Principle that provides a means for assessing the tolerability of risk. A risk is ALARP if the cost of any reduction in that risk is grossly disproportionate to the benefit obtained from the reduction.
<b>ALERT</b>	Alert Disaster Control (Asia) Pte Ltd - an international oil and gas well control engineering specialist contracted by PTTEPAA to provide specialist advice on possible options to contain the Uncontrolled Release and on implementation of the elected option and to provide specialist engineers to assist with the implementation of the operations to contain the Uncontrolled Release.
<b>AMR</b>	Australian Maritime Resources Pty Ltd the contracted aerial dispersant operator who flew single-engine spraying aircraft out of the Truscott aerodrome in Western Australia, the closest despatch point for fixed wing aircraft to fly to the <i>West Atlas</i> .
<b>APPEA</b>	The Australian Petroleum Production & Exploration Association is the peak national body representing Australia's oil and gas exploration and production industry
<b>Australian Maritime Safety Authority (AMSA)</b>	National safety agency responsible for maritime safety, protection of the marine environment and aviation and marine search and rescue. It is the lead authority on the management of major spills and the managing agency of the National Plan.
<b>Australian Marine Oil Spill Centre (AMOSC)</b>	Operates Australia's major oil spill response equipment stockpile on 24 hour stand-by for rapid response anywhere around the Australian coast.  The activities of AMOSC are fully integrated into ' <i>The National Plan to Combat Pollution of the Sea by Oil and other Hazardous and Noxious Substances</i> ', managed by AMSA on behalf of the Federal, State and Northern Territory authorities and the oil and shipping industries. The oil industry contributes to the equipment and running costs of the National Plan.
<b>Annular preventer</b>	The upper part of the BOP which is a rubber sealing element than can be squeezed to create a seal on any pipe size and some irregular shaped components.
<b>Annulus</b>	The ring-shaped cavity between two concentric tubes eg inner and outer strings of casing or between casing or drill string and the well borehole.
<b>Atlas Drilling</b>	Atlas Drilling (S) Pte Ltd - owner of the <i>West Atlas</i> and <i>West Triton</i> Drilling Rigs.

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<b>Australian Quarantine and Inspection Service (AQIS)</b>	Part of the Australian Government Department of Agriculture, Fisheries and Forestry and manages quarantine control.
<b>Back out</b>	In drilling, to pull the drill string out of, or partly out of the borehole.
<b>Barite</b>	A very heavy substance used as a main component of drilling mud, to increase its density and counter balance downhole pressures.
<b>Barrel (bbls)</b>	Unit of volume measurement used for petroleum and its products: 1 barrel = 159 litres approximately.
<b>Batch drilling</b>	When multiple wells with a similar configuration are drilled together for reasons of efficiency. Efficiency is achieved as there is less movement of equipment and people and less down time spent rigging up and down the drill rig. It also allows the lessons learnt during the drilling of one well to be transferred to the drilling of the next well which improves both safety and efficiency of the drilling of the next well.
<b>BA51L</b>	Tool used to clean casing threads.
<b>Black Shutdown</b>	Shutdown of all power generation systems on the drilling rig.
<b>Bled off</b>	Equalise or relieve pressure from a vessel or system. In order to conduct pressure tests, fluid is pumped into a vessel or system to increase the pressure. At the conclusion of the pressure test or treatment, the fluid must be extracted safely to equalise the pressure and allow subsequent phases of the operation to continue.
<b>Blow Out Preventer (BOP)</b>	<p>Device is used to contain pressure in the well in the event that a pressure differential is noted in the well bore. The BOP is placed on the top of the wellhead above the drill string.</p> <p>The BOP manages pressure in the well in one of two ways:</p> <ul style="list-style-type: none"> <li>• hydraulic rams - grips the pipe and seal the area outside of the pipe and a pump below the rams is then used to stabilise the pressure; or</li> <li>• an annular preventer which squeezes the pipe to seal off the area, the pump below the rams is then used to stabilise pressure.</li> </ul>
<b>Borehole</b>	A well, especially referring to the case of the rock outside or below the casing.
<b>Bottom hole</b>	The deepest part of a well.
<b>Bottom Hole Tool Assembly (BHA)</b>	Comprises a drill bit, rotary steering tool, measurement whilst drilling device, a drilling jar and several drill collars which is run into the well

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	on the end of the drill string.
<b>Bottom Plug</b>	The first plug inserted into the casing during the cementing operations.
<b>Bump (the plugs)</b>	When the top plug hits the bottom plug.
<b>Capping Option</b>	An option to stop an uncontrolled release from a oil well which involves placing personnel on the WHP and drilling rig and skidding the cantilever of the drilling rig inboard so the well flow is no longer hitting the underside of the drilling rig and then the wellhead is lifted into place and the casing secured. Following the securing of the casing a BOP is put in place and the wellhead closed in order to stop the flow. Once the flow is stopped Mud is used to kill the well and mechanical plugs then put in place.
<b>Cantilever</b>	A beam on the drill rig which is supported on only one end. The beam carries the load to the support where it is resisted by movement and shear stress.
<b>Casing</b>	The steel pipes with which a well is lined for protection against collapse of the borehole and unwanted leakage into or from rock formations or at the surface. Joints of casing are normally screwed together as they are run into the well.
<b>Casing Hanger</b>	The lug or bracket from which the drill string is suspended at the MLS.
<b>Casing String</b>	Series of Casing pipes.
<b>Cement</b>	Used to set casing in the wellbore and seal off unproductive formations and apertures. Two types of cement are used - lead cement and tail cement.
<b>Cement Head</b>	Apparatus used to pump cement into the well and pressure test the cement when it has set.
<b>Cement Plug</b>	A plug of cement which is placed in the wellbore as a barrier. Cement plugs are used for a variety of applications including hydraulic isolation, provision of a secure platform, and in window-milling operations for sidetracking a new wellbore.
<b>Cement Stringer</b>	A narrow pipe through which cement is run through the BHA.  This pipe needs to be very narrow so it does not act like a piston and result in the cement being suctioned back out the well when it is pulled out prior to the well being pressurised and the plugs bumped.
<b>Cement Unit</b>	Unit on the drilling rig utilised for the cementing operations of a well.
<b>Centralisers</b>	Spacing collars attached to the outside of casing when run in a well, to keep it central in the bore and ensure an evenly-shaped annulus in which cement can circulate and set.

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<b>CEO</b>	Chief Executive Officer
<b>CFO</b>	Chief Financial Officer
<b>Challis Oil Field</b>	The Challis Oil Field at which PTTEPAA operates the Challis Venture FPSO.
<b>Check Valve</b>	A non-return valve, allowing only one-way flow.
<b>Christmas Tree</b>	Manifold, or arrangement of pipework connections and valves which is installed on the wellhead prior to production. As well as outlets for production, the tree will provide for the injection of mud to kill the well and for the insertion of downhole maintenance tools.
<b>Circulation</b>	In drilling, the passage of fluids, primarily drilling mud, down the interior of the drill string and back to surface via the annulus.
<b>Cold Cut</b>	Cut which is made without using “hot work” ie a flame or other method that could cause a fire.
<b>Combat Agency</b>	<p>Agency with the specific expertise and equipment to deal with the effects of designated hazards.</p> <p>Under the National Plan responsibilities are divided between the Statutory Agency and the Combat Agency.</p> <p>In this case the Combat Agency was PTTEPAA, which had operational responsibility to take action to respond to the marine pollution, however, this role was transferred to AMSA.</p>
<b>Conductor</b>	First piece of casing which is cemented into the wellbore. It acts as the foundation for the well, support for the subsequent casing and protects against hole collapse due to unstable rock formations between the bottom of the hole and the surface.
<b>COO</b>	Chief Operating Officer
<b>Corrosion Caps</b>	Pressure containing caps which screw into the casing in order to establish mechanical barriers to maintain the pressure in the well at a level that is higher than the pore pressure.
<b>Crisis Management Team (CMT)</b>	PTTEPAA’s team responsible for the strategic management of emergencies which present an actual or potential threat to PTTEPAA’s long term ability to do business due to the impact on operability, image or liability. The CMT coordinates all media response but does not become involved in the tactical emergency response.
<b>Crude Oil</b>	Unrefined oil.
<b>Cuttings</b>	The small chips or flakes of rock retrieved from a well by the circulation of the mud. They are studied and logged by the well-site

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	geologist.
<b>Deluge Option</b>	Spraying the WHP and West Atlas with water into order to dampen them to lessen the consequences should a fire occur.
<b>Deluge Safety Case</b>	The Safety Case for the Deluge Option
<b>Derrick</b>	The pylon-like steel tower which provides the vertical lifting capacity necessary to raise and lower the drill string into and out of the wellbore.
<b>Designated Authority</b>	The Northern Territory Department of Regional Development, Primary Industry, Fisheries and Resources.
<b>Development well</b>	Any well drilled in the course of extraction of reservoir hydrocarbons, whether specifically a production well or injection well.
<b>DEWHA</b>	Commonwealth Department of Environment, Water, Heritage and the Arts. Administers the EPBC Act.
<b>DFAT</b>	Commonwealth Department of Foreign Affairs and Trade.
<b>Differential Pressure</b>	The difference between the pressure in a well due to the mud column and the pressure in the surrounding rock at any point.
<b>Directional Drilling</b>	Use of the MWD device and RST to direct the drill string in the hole.
<b>Down hole</b>	Down a wellbore.
<b>DRET</b>	Commonwealth Department of Resources Energy and Tourism.
<b>Drill Bit</b>	Cutting device used to penetrate the rock formation.
<b>Drill Collars</b>	Heavy thick walled pipes which provide the mass necessary to apply weight to the drill bit.
<b>Drill String</b>	The series of pipe sections screwed together which acts as a conduit for the Mud and is used to connect the BHA with the top drive located on the Drilling Rig.
<b>Drilling Fluid</b>	See Mud.
<b>Drilling Jar</b>	Used to create a hammer like effect to free the drill string if it gets caught whilst drilling.
<b>Drilling Program</b>	PTTEPAA Drilling Programs and variations submitted to and approved by the Designated Authority.
<b>Drilling Rig</b>	The permanent equipment needed for drilling a well. It comprises the derrick, the rotary table, a mud pump and mud circulation system, a BOP and a system for handling casing.
<b>Drilling Superintendent</b>	PTTEPAA's Drilling Superintendent.

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<b>Drilling Supervisor</b>	PTTEPAA's Drilling Supervisor.
<b>Emergency Control Team (ECT)</b>	Responsible for the initial response to any oil spill emergency and the provision of all front-line resources for a Tier 1 oil spill. The ECT is under the operational direction of the person in charge of the facility ie the OIM.
<b>Emergency Response Group (ERG)</b>	Perth based PTTEPAA group responsible for the management and co-ordination of emergencies. The ERG provides shore based support to the offshore facilities and to the aviation support base and mobilises additional external resources as required to respond to the emergency.
<b>Equivalent Mud Weight (EMW)</b>	Pressure felt by the formation when circulating with a certain mud weight and holding a backpressure.
<b>Ensko 104</b>	The Jack-up drilling rig owned by Ensko and under contract to Conoco Phillips in Bayu-Undan in the JPDA.
<b>Environmental Plan (EP)</b>	Describes the proposed activities and the receiving environment, identifies and assesses potential environmental effects and risks, describes the environmental performance objectives and standards applicable to the activities and to outline the implementation strategy proposed to ensure that environmental performance objectives and standards are met.
<b>EPBC Act</b>	<i>Environmental Protection and Biodiversity Conservation Act 1999</i> (Cwth)
<b>Fault</b>	A discontinuity in a rock formation caused by fracturing of the earth's crust.
<b>First Oil</b>	When oil is first extracted from the field.
<b>FIT</b>	Formation Integrity Test - a test to check the integrity of the Casing and cement which is stopped when the achieved pressure meets a predetermined criteria.
<b>Float</b>	Method of inserting heavy lengths of casing into a well without overstressing joints and seals due to the weight of the total string. The bottom end is sealed and the hollow string then becomes buoyant in the mud in the well, which are gradually displaced.
<b>Float Collar</b>	Component installed near the bottom of the Casing String on which the plugs land during the primary cementing operation. It typically consists of a short length of Casing fitted with a check valve. This device may be a flapper-valve type, a spring-loaded ball valve or other type. The check-valve assembly fixed within the float collar prevents flowback of the cement when pumping is stopped. Without a Float Collar, the cement pumped into the Annulus could U-tube, or reverse

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	flow back into the Casing. The greater density of the cement than the Mud inside the Casing causes the U-tube effect.
<b>Float Shoe</b>	Rounded profile component attached to the downhole end of a casing string. An integral check valve in the Float Shoe prevents reverse flow, or U-tubing, of cement from the annulus into the Casing or flow of wellbore fluids into the Casing String as it is run. The Float Shoe also guides the casing toward the centre of the hole to minimise hitting rock ledges or washouts as the Casing is run into the wellbore.
<b>Floating Production, Storage and Offloading (FPSO) facility</b>	Type of floating tank system used and designed to take all of the oil and gas produced from nearby wells (subsea or at a platform), process it and store it until the oil or gas can be offloaded onto a tanker or transported through a pipeline.
<b>Formation Integrity Test (FIT)</b>	Pressure test to measure rock strength.
<b>Fracture Pressure</b>	The pressure at which a rock breaks.
<b>Gas Injection</b>	Secondary recovery method by which gas is injected into and passed through the reservoir to maintain pressure and/or entrain heavier hydrocarbons left behind by primary production.
<b>Gas-Oil Contact (GOC)</b>	Level at which the gas and oil in the reservoir contact each other. In the Montara reservoir there are three levels - gas, oil and water.
<b>GI</b>	Gas Injection Well through which Gas injection takes place.
<b>H1, H2, H3, H4</b>	Production wells to be drilled in the Montara Field by PTTEPAA.
<b>H1 Well/ H1 ST1 Well</b>	The well from which the Uncontrolled Release emanated.
<b>H1 ST1 RW1 Well</b>	The Relief Well.
<b>HAZID</b>	Hazard Identification Study.
<b>Hang Off Point (HOP)</b>	Where the MLS hanger lands out on the internal ring of the larger outer casing.
<b>Helideck</b>	The top deck in the WHP.
<b>Helideck Hatch Cover</b>	Part of the helideck that covers the hole in the helideck so that the rig can access the WHP below.
<b>Horizontal drilling</b>	Technique for deviating wells through up to 90° from the vertical, but more importantly, “horizontal” to the reservoir strata. While the main purpose of normal deviated drilling is to reach remote parts of a reservoir, with horizontal drilling the purpose is to keep the bore within a given productive horizon or formation to increase potential productivity.

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<b>HSE</b>	Health Safety and Environment
<b>Hydrocarbons</b>	Organic compounds of Carbon and Hydrogen.
<b>Hydrostatic pressure</b>	Pressure exerted by a column of liquid at a given depth, such as that exerted by mud in a well.
<b>Inhibited Seawater</b>	Seawater containing anti-corrosion chemicals.
<b>IFR (modelling)</b>	Infield Reference modelling, used to reprocess surveys of the location of the H1 Well as part of the relief well operation.
<b>Isolation packers</b>	Mechanical plugs/barriers installed into a well.
<b>Jabiru Oilfield</b>	The Jabiru Oilfield at which PTTEPAA operates the Jabiru Venture FPSO.
<b>Jacket</b>	The leg structure of an offshore platform connected to the seabed.
<b>Jack-up drilling rig</b>	A type of drilling rig or MODU which is a mobile platform that is able to stand on the seabed supported by three legs. During transit, the platform floats on its hull and is typically towed to location by a tug boat. The supporting legs may be moved up and down and are secured to the seabed when in location. When the supporting legs are secured, the rig platform is jacked up to the required elevation.
<b>Java Constructor</b>	Construction vessel facility used to install the topsides on the WHP jacket.
<b>JPDA</b>	Joint Petroleum Development Area
<b>Keeper Gyro</b>	A gyroscopic survey tool that was used to survey to accurately determine the location of the H1 Well and proposed Target. It has better mechanical accuracy than the magnetic compass in the MWD tools.
<b>Kill</b>	To inject mud into a flowing well to the density needed to overcome the reservoir pressure thus stopping the flow.
<b>Lady Gerda</b>	An offshore support vessel engaged by PTTEPAA to spray dispersant.
<b>Lead cement</b>	Type of cement which is pumped into the well first during cementing and has a lower density than tail cement.
<b>Leak Off Test (LOT)</b>	Pressure test which fractures the rock.
<b>Lower Johnson and Upper Puffin</b>	Rock formations in the Montara Field.
<b>Measured Depth (MD)</b>	The total length of the drilled hole in kilometres.
<b>Measurement Whilst Drilling (MWD)</b>	Downhole instrument system used to monitor geological parameters and control the direction of the wellbore to the high degree of accuracy

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<b>device</b>	needed for example horizontal drilling.
<b>Minsister Albanese</b>	Commonwealth Minister Anthony Albanese MP who relevantly has responsibility for the Commonwealth Department of Infrastructure, Transport and Regional Development and Local Government. AMSA is within the portfolio of Minister Albanese's Department.
<b>Minister Ferguson</b>	Commonwealth Minister Martin Ferguson MP who relevantly has responsibility for the DRET. NOPSA and the NTDRDPIFR in its role as the DA are within the portfolio of Minister Ferguson's Department. Minister Ferguson's Department, NOPSA and the DA between them administer the OPGGS Act, MOSOF Regulations and <i>Petroleum (Submerged Lands) (Occupational Health and Safety) Regulations 1993</i> , WOMP Regulations and the MOE Regulations.
<b>Minister Garrett</b>	Commonwealth Minister Peter Garrett MP who relevantly has responsibility for the DEWHA. Administers EPBC Act.
<b>MODU</b>	Mobile Offshore Drilling Unit
<b>Monitoring Plan</b>	The plan to monitor the impacts on the environment of the Uncontrolled Release.
<b>Montara Development Project</b>	The development by PTTEPAA of the Montara, Skua and Swift/Swallow Fields, within the AC/L7 and AC/L8 Production License areas in the East Timor Sea.
<b>Montara Field</b>	The Montara petroleum (oil and gas) accumulation. The objective of the Montara Development Project is to extract petroleum from the Montara Field using four production wells (H1, H2, H3 and H4) and to re-inject gas into the Montara Field using the GI well.
<b>Marine Oil Spill Equipment System (MOSES)</b>	Computer based system for the management of National Plan equipment. It includes comprehensive information on equipment owned by AMSA, States/NT and industry and also provides logistics and maintenance history information. It also generates details of equipment used in incident responses for cost recovery.
<b>Measurement Whilst Drilling (MWD)</b>	A device which enables measurements to be taken whilst drilling of the distance that has been drilled.
<b>MOSOF Regulations</b>	<i>Petroleum (Submerged Lands) (Management of Safety on Offshore Facilities) Regulations 1996</i>
<b>MOE Regulations</b>	<i>Petroleum (Submerged lands) (Management of Environment) Regulations 1999</i>
<b>Mud</b>	Drilling fluid used to transport cut rock fragments from the well, cool the drill bit and to provide hydraulic pressure to support the hole being drilled.

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	The Mud is a complex mixture of fluids, solids and chemicals which must be carefully tailored to provide the correct physical and chemical characteristics required to stabilise the rock formations being drilled and safely drill the well.
<b>Mud line</b>	The seabed or bed of any body of water where drilling is taking place.
<b>Mud Line Suspension (MLS) system</b>	Used to support (hang) the inner casing of a well on the outer casing. Comprises an MLS hanger on the outside of the inner casing and an MLS hang-off ring (or shoulder) on the inside of the outer casing.
<b>Mutual Aid Contact (MAC)</b>	Designated representative from each of the oil companies operating in a particular port or area. PTTEPAA's MACs are the Offshore Installation Managers (OIMs) who periodically participate in AMSA Workshops for on-scene co-ordination of oil spills. Such training gives the MACs the opportunity to interface with other operators, a working knowledge of oil spill equipment and an insight to AMOSC capability.
<b>National Plan</b>	Australia's national strategy to respond to marine oil spills: <i>The National Plan to Combat Pollution of the Sea by Oil and other Hazardous and Noxious Substances</i> . A key purpose of the National Plan is to maintain a national integrated framework for Government and industry, capable of effective response to oil pollution incidents in the marine environment.
<b>Nipple Up</b>	To assemble pipe valves (especially to a BOP).
<b>NOPSA</b>	National Offshore Petroleum Safety Authority - the safety regulator under the OPGGS Act. Administers the safety sections of the OPGGSA, the MOSOF Regulations and the <i>Petroleum (Submerged Lands) (Occupational Health and Safety) Regulations 1993</i>
<b>NTDRDPIFR</b>	Northern Territory Department of Regional Development, Primary Industry, Fisheries and Resources. Administers the environmental and well management sections of the OPGGSA, the MOE Regulations and the WOMP Regulations.
<b>Ocean Shield</b>	The Jack-up drilling rig owned by Diamond Offshore and under contract to ENI in the Black Tip Field in the Joseph Bonaparte Gulf in the Timor Sea.
<b>Offshore Installation Manager (OIM)</b>	Offshore Installation Manager of the West Atlas.
<b>OSCP</b>	PTTEPAA's Oil Spill Contingency Plan
<b>OPGGS Act</b>	<i>Offshore Petroleum and Greenhouse Gas Storage Act 2006</i>
<b>Oil Fraction</b>	Proportion of oil in a liquid.

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<b>Oil/Water Contact</b>	The lower end of the oil column in a reservoir with underlying water.
<b>OIM</b>	Offshore Installation Manager
<b>Open Hole</b>	An uncased section of well borehole.
<b>Operational Monitoring</b>	<p>Environmental monitoring was conducted during the oil containment and recovery operations and the majority of which ceased on completion of the oil containment and recovery operations. Operational Monitoring studies have provided data to enable decisions to be made as to which of the Scientific Monitoring studies are required. The Operational Monitoring comprised of the following studies:</p> <ul style="list-style-type: none"> <li>• Monitoring of Oil Distribution and Marine and Coastal Megafauna (Study O1);</li> <li>• Monitoring of Oil Character Fates and Effects (Study O2);</li> <li>• Shoreline Assessment Ground Surveys (Study O3);</li> <li>• Monitoring of Dispersant Efficiency and Fate of Dispersed Oil (Study O4); and</li> <li>• Wildlife Impact Monitoring (Study O5).</li> </ul> <p>Operational Monitoring is managed by AMSA. It was included in the Monitoring Plan to provide information about environmental monitoring already underway during the oil recovery and containment operations and to provide background to, and information for the Scientific Monitoring programme.</p>
<b>Packer</b>	A mechanical seal used to isolate a section of well.
<b>Plug</b>	To seal a well, or part of a well with cement, eg before producing from a higher formation, sidetracking, or leaving the well permanently sealed or abandoned.
<b>Pore pressure</b>	Hydrostatic pressure in a rock. In general, pore pressure increases with drilling depth.
<b>Pressure testing</b>	Used to test the integrity of casing or a cement shoe.
<b>Pressure up</b>	Pumping fluid into the casing to increase the pressure to a programmed test pressure.
<b>Production</b>	The full scale extraction of hydrocarbon reserves.

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<b>Production Casing</b>	The innermost steel lining of a well cemented in place and perforated for production. Note that production tubing is inserted inside this casing.
<b>Rat hole</b>	Area between the casing shoe and total depth.
<b>psi</b>	Pounds per square inch
<b>Relief Well</b>	The Montara H1 ST1 RW1 well.
<b>Reservoir</b>	A porous, fractured or cavities rock formation with a geological seal forming a trap for producible hydrocarbons.
<b>Riser</b>	A pipe through which fluids flow upwards, as from a subsea wellhead or gathering pipeline to the deck of a platform.
<b>Rate of Penetration (ROP)</b>	Rate at which a wellbore is drilled.
<b>ROV</b>	Remote Operated Vessel.
<b>Rotary Steering Tool (RST)</b>	Tool used to steer the drill bit to enable controlled placement of the well within the rock formations.
<b>Rotary table</b>	The heavy turntable at the centre of a drilling rig floor, which is rotated by the main rig power supply, and in turn rotates the drill string.
<b>RTTS Packer</b>	Mechanical pressure isolation device inserted into a well.
<b>Running in</b>	Inserting any tubular or tool into a well is known as “running in”. Assembling and lowering in a string of casing is known as “running casing”.
<b>Safety case</b>	<p>Document prepared and submitted by the operator of a facility to NOPSAs for acceptance pursuant to the MSOF Regulations. Safety cases are required to make provision for the following matters in relation to health and safety of people at or near the facilities:</p> <ul style="list-style-type: none"> <li>• identification and assessment of risks;</li> <li>• the implementation of measures to eliminate the hazards or otherwise control the risks;</li> <li>• a comprehensive and integrated system for management of the hazards and risks; and</li> <li>• monitoring, audit, review and continuous improvement.</li> </ul>
<b>Scientific Monitoring</b>	Scientific Environmental Monitoring. Whether Scientific Monitoring is required will be determined by the occurrence of triggers for each study. The likely duration of each Scientific Monitoring study will be agreed at the commencement of the study but will ultimately depend on

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UNCONTROLLED HYDROCARBON RELEASE**

PTTEPAA

GLOSSARY OF TERMS

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<b>Term</b>	<b>Definition</b>
	<p>the outcome of the monitoring. The Scientific Monitoring studies include the following, with detailed Scopes of Work to be developed for each of these following appointment of the experts to lead the studies that have been triggered:</p> <ul style="list-style-type: none"> <li>• Marine Megafauna Aerial Assessment Surveys (Study S1);</li> <li>• Shoreline Ecological Assessment Aerial Surveys (Study S2);</li> <li>• Assessment of Fish Catch for the Presence of Oil (Study S3);</li> <li>• Assessment of Effects on Timor Sea Fish and Fisheries (short term - Study S4A long term - Study 4B);</li> <li>• Offshore Banks Assessment Survey (Study S5);</li> <li>• Shoreline Ecological Ground Surveys (Study S6); and</li> <li>• Oil Fate and Effects Assessment (Study S7).</li> </ul>
<b>SCR</b>	Safety case revision.
<b>Screen</b>	Tubular “sieve” inserted into a wellbore to hold back loose sand and rock, while letting oil and gas enter the well.
<b>Shoe</b>	Strengthened fitting on the lower end of a string of casing which helps to direct the cement to the annulus.
<b>Shoe Track</b>	Comprises a float shoe at the end of the casing, a section of 12.6m casing and then a float collar.
<b>Shoe Track Volume</b>	Volume of the shoe track, which is filled with cement during the cementing process.
<b>Sidetrack</b>	Well re-drilled from an intermediate depth. Wells are re-directed or sidetracked for various reasons, but usually because of technical problems deeper in the original well.
<b>Skid (the Derrick)</b>	Move the Derrick to a position above another wellhead, or “slot” where a well is to be drilled or worked over.
<b>Skidded</b>	The process of moving the Drilling Derrick to a location (for example, over a WHP) where a well is to be drilled.
<b><i>Songa Mecur</i></b>	The floating drilling rig owned by Songa and contracted to Total and on standby in Dampier, but shortly due to commence a contract with Woodside for the Pluto development drilling.

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<b>Specific gravity (sg)</b>	Density of a substance divided by the density of water.
<b>Spud (a well)</b>	Start drilling a new well.
<b>Statutory Agency</b>	Under the National Plan, responsibilities are divided between the Statutory Agency and the Combat Agency. The Statutory Agency has statutory responsibility for the area in which a pollution incident occurs. The Statutory Agency in the Territory of Ashmore and Cartier Island Waters is NTDRDPIFR. The Statutory Agency regulates the implementation of oil spill contingency plans, and is the recipient of oil spill incident reports.
<b>String</b>	Any number of connected joints of tubulars (drill or casing) run in the well.
<b>Sub-sea Option</b>	Two option options were considered to stop the Uncontrolled Release above the sea-bed, but below the sea surface. These involved either fabricating a machine to crush the casing and block off the well flow or cutting the casing and capping it underwater.
<b>Suspension As-Built</b>	Drawing of the well suspension.
<b>Surface Casing</b>	The casing that is used between the Conductor and the Production Casing.
<b>Tail cement</b>	Type of cement that is pumped in after the lead cement during cementing and has a higher density and thickening time than the lead cement to ensure a solid bond around the shoe track.
<b>Target</b>	The proposed intersection point of the H1 ST1 Well by the H1 ST1 RW1 Well.
<b>Total Depth (TD)</b>	Target depth for a well.
<b>Tie Back</b>	Adding a piece of Casing to extend the well up to the mezzanine deck on the WHP. This is done in wells have been suspended and abandoned for a period prior to work on the wells recommencing.
<b>Top Gas</b>	Gas at the top of a reservoir.
<b>Top of Cement (TOC)</b>	The height of cement in the annulus. The cement rises up the annulus to seal off formations and provides support to the casing.
<b>Topsides/WHP Topsides</b>	Part of the WHP placed on top of the Jacket and includes controls, process equipment and a helicopter deck.
<b>Trash Cap</b>	A non-pressure containing cover to prevent debris entering the well.
<b>Tripping In</b>	Lowering casing into the wellbore.
<b>Tripping Out</b>	Lifting casing out of the wellbore.

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<b>True Vertical Depth (TVD)</b>	Measurement of a straight line perpendicular from a horizontal plane.
<b>TST Aviation Support Base (TST)</b>	Responsible for providing aviation and initial shore-based support services to PTTEPAA facilities and other contracted service providers. The TST Base Manager co-ordinates initial emergency and oil spill support activities involving TST facilities and aircraft. The TST Base Manager liaises with the ERG and the offshore facility.
<b>Total Vertical Depth (TVD)</b>	Vertical depth of the well from the sea bed.
<b>Uncontrolled Release</b>	The flow from the H1 ST1 Well which commenced on 21 August 2009.
<b>Vector Mechanics</b>	New York based specialist who operated a ranging tool that was used to locate the H1 Well during the relief well operation.
<b>WA Department of Fisheries</b>	The Western Australian Government Department of Fisheries
<b>WA Department of Transport</b>	The Western Australian Government Department of Transport
<b>Wait On Cement (WOC)</b>	Wait for the cement to set. The time period where the drillers wait on the samples of cement they have retained above surface to set before the pressure in the well is Bled off again to check the casing
<b>Well Construction Management System</b>	PTTEPAA Well Construction Management System.
<b>Well Construction Manager</b>	PTTEPAA's Well Construction Manager.
<b>Well Construction Standards (WCS)</b>	PTTEPAA Well Construction Standards which form part of the PTTEPAA Well Construction Management System. The purpose of the WCS is to provide standards for all aspects of well design, construction, testing, abandonment and intervention that involve a risk to safety, quality or integrity. The WCS are applicable to all aspects of well design, well construction, well servicing and well abandonment.
<b>Wellhead</b>	Connected to the top of the casing on the WHP. The wellhead has a flange or hub connector to which the BOP can be secured.
<b>Wellhead Platform (WHP)</b>	An offshore platform comprising the Jacket and Topsides.
<b>West Atlas</b>	West Atlas drilling rig - owned by Atlas Drilling and contracted by PTTEPAA to drill the Montara Field wells.
<b>West Triton</b>	Drilling rig contracted by PTTEPAA to drill the relief well.

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<b>Whipstock</b>	Tool for deviated drilling, basically a wedge-shaped block which is lowered into the well to divert the bit into a chosen path at an angle to the original hole.
<b>Well Operations Management Plan (WOMP)</b>	PTTEPAA's WOMP demonstrates the management system applicable to the design and implementation of the well operations which is submitted to the Designated Authority, with the Application to Drill, for acceptance pursuant to the WOMP Regulations.
<b>WOMP</b>	Well Operations Management Plan required under WOMP Regulations.
<b>WOMP Regulations</b>	<i>Petroleum (Submerged Lands) (Management of Well Operations) Regulations 2004</i>