

Well Control Contingency Plan Guidance Note

(version 2)

02 December 2015

Prepared by
Maritime NZ



Contents

- Introduction3
- Purpose3
- Definitions4
- Contents of a Well Control Contingency Plan (WCCP)4
 - Scenario identification4
 - Operational and environmental information4
 - Reservoir characteristics4
 - Maximum anticipated discharge flow potential5
 - Environmental Factors5
 - Oil spill trajectory modelling5
- Intervention options for loss of well control scenarios6
 - Source control6
 - Description of intervention options6
 - Capping Devices6
 - Relief Wells6
 - Responsibilities of parties during a response7
 - Response Equipment and Services7
 - Mobilisation Plans8
 - Mobilisation timing8
- Operators capacity to undertake proposed response activities8

Introduction

This is Version 2 of the guidance note that covers the Well Control Contingency Plan (WCCP) which is to be provided as part of an Oil Spill Contingency Plan (OSCP) under Marine Protection Rule (MPR) Part 131 (formerly a Discharge Management Plan (DMP) under MPR Part 200) by an operator of an offshore installation.

A WCCP should be developed in all cases where the OSCP identifies activities that may lead to a loss of well control resulting in the release of hydrocarbons into the marine environment. A WCCP should be provided to meet the requirements of the Schedule in MPR Part 131. The WCCP requirements outlined in this guidance note apply to existing DMP's when they are renewed (and become OSCP's) and to OSCP's sought for new installations.

This guidance note should be referred to in addition to MPR part 131 and any associated Advisory Circular. The contents described below may be used as a guide to what should be included in a WCCP, but an operator is able to submit a plan in any form as long as it clearly meets the intended purpose of the WCCP in the wider context of MPR 200. This would include submitting components of the plan as part of the Oil Spill Contingency Plan. Maritime New Zealand (MNZ) is happy to discuss any aspect of the plan during its development.

This document is effective as of the 1st of November 2015.

Purpose

The WCCP will be used by the operator and responding agencies in the event that well control is lost and hydrocarbons are released into the marine environment. The operator, as the party responsible for stopping the release of hydrocarbons at its source, must demonstrate that they have prepared for a worst-case scenario and that they have the means to resolve the situation, no matter how unlikely it might be.

After the safety of personnel, the primary focus during a loss of well control incident is to be able to shut-in the well – stopping all hydrocarbon flow to the environment as quickly as possible. Many methods could and would be taken to shut in a well, including using the Blowout Preventer (BOP), intervening down-hole, capping, or using other direct intervention means such as commencing relief well drilling.

The focus of the plan is blow out control and recovery rather than blow out prevention, which is dealt with by other documents (e.g. detailed drilling and completions programme and risk register) and other regulatory regimes (e.g. Health and Safety in Employment (Petroleum Exploration and Extraction) Regulations).

The WCCP should be customised for each situation based on information about the well/s and the installation/s and the activities to be undertaken during the period of the OSCP. Acknowledging that there will always be unknowns, operators should reference the source of information presented in the plan or otherwise justify it so that all parties have an appropriate level of confidence underpinning their decisions.

Definitions

Exploration well	Any well drilled from a mobile drilling unit (MODU) such as a drill ship, semi-submersible or jack up rig for the purpose of securing geological or geophysical information to be used in the exploration of an oil and gas field.
Relief well	A well drilled to intersect an oil or gas well that has experienced a blowout.
Blowout	A blowout is an incident where formation fluid flows out of the well in an uncontrolled way after some or all of the well control barriers have failed (uncontrolled)
Capping	Capping is the act of putting a device on a subsea well where there is an uncontrolled flow of hydrocarbons in order to either shut-in the well or to collect the hydrocarbons so that they are prevented from entering the marine environment..
Containment	A system used to bring leaking oil from a subsea wellhead to the surface, in a controlled way, for storage and disposal.
Primary well control	Control of the natural pore pressure found in down-hole formations (usually) by means of an overbalanced drilling or completion fluid but sometimes by a combination of overbalanced fluid and surface back-pressure.
Stochastic modelling	A specific methodology for modelling used to determine the range of distances and directions oil spills from a particular site are likely to travel, given the historical wind speed and direction data for the area

Contents of a Well Control Contingency Plan (WCCP)

Scenario identification

The plan should identify potential well control failure scenarios (e.g. BOP failure, rig fire, loss of well bore integrity) and the associated probabilities of these occurring. The plan should also outline the implications of each scenario on the potential response options.

Operators should not eliminate loss of well control scenarios from further consideration simply because they consider there is a very low likelihood of them occurring. For example, when identifying blowout scenarios, the fact that a range of control measures may be put in place to minimise the risk of a blowout does not mean that this scenario no longer requires further preparedness and response controls that may contribute to minimising the consequence of the event.

Operational and environmental information

The purpose of this information is to inform well control options and oil spill response. This information should include, but is not restricted to:

Reservoir characteristics

The operator should identify well and reservoir information including information outlining the nature of the hydrocarbons (crude/gas/condensate and contaminants including maximum concentrations); the well flow characteristics; and the maximum shut-in wellhead pressure. If there are reservoir characteristics relevant to this information, such as High Pressure and High Temperature (HP/HT) conditions, this information should also be included.

For exploration wells analogues could be used to demonstrate an understanding of potential reservoir content. Where there is uncertainty surrounding reservoir characteristics, operators should describe the possible range anticipated for each characteristic, and confirm these details where relevant as they become available after commencing drilling.

Maximum anticipated discharge flow potential

The plan shall include information on the realistic worst-case scenario in relation to the potential release of reservoir hydrocarbons including the potential daily release rate and the total quantity of hydrocarbons that could be released during the maximum time that it could take to stop the release. The scenario should be directly related to the particular circumstances of the installation, the proposed activities, and the reservoir characteristics, and should be consistent with the information used by other operational departments, e.g. well engineering.

For example, if the operation involves the drilling of a dry gas well, and no oil or condensate is expected, or there is insufficient reservoir pressure for a well to flow naturally, or if the flow rate is likely to reduce significantly during the period of any release, or if there is the likelihood that the well will “bridge over” (i.e. seal itself with rock fragments from collapsing formations), this should be reflected in the WCCP as it is likely this will affect the pollution response strategy and the assessment of any potential environmental impact.

If the WCCP covers more than one well, details of each well’s flow rates should be included to allow the plan user to gain an understanding of potential release rates in the event of a well incident. The well with the greatest discharge flow potential should be used for modelling purposes and to determine adequate response recourses.

The selected flow rate should be used to calculate the predicted total loss of hydrocarbons during the period covered by the modelling, and during the estimated time taken to stop the release, and the calculated volumes should be clearly stated.

Environmental Factors

The plan should include weather and ocean conditions that will impact on well control and oil spill response operations. This includes relevant seasonal data such as:

- predominant wind conditions
- wave conditions
- currents
- water depth
- sea and air temperatures

Oil spill trajectory modelling

Oil spill trajectory modelling must be provided to determine the impact of potential oil spills with results giving an indication as to the likely fate (weathering and transport) of the oil.

Stochastic modelling must be carried out based on the identified installation specific worst-case release scenarios to determine the fate of the released liquid hydrocarbons. Stochastic models should be used to determine the areas that could be impacted using data that is relevant to the hydrocarbon types and the estimated uncontrolled flow rate. If the depth of the release beneath the sea surface could significantly affect the dispersion and fate of the released hydrocarbons, this should be taken into consideration. However, the deep water release assessment cannot be solely relied upon as it does not accommodate all release scenarios, so it would also be necessary to separately model an equivalent surface release. If subsea dispersant application is an identified response option, modelling of the dispersed oil plume should also be provided.

The models must be run for a period of time that is sufficient to identify the potential directions of travel and the areas likely to be at risk. As a minimum, the models must be run for a period of 30 days under worst-case liquid hydrocarbon release conditions. If the minimum 30-day modelling period does not clearly identify the potential areas at risk, then the modelling period must be extended.

The modelling must be undertaken using relevant weather, current and temperature data obtained from scientifically-validated historic data sources, and the origin of this information must be fully referenced.

Intervention options for loss of well control scenarios

Source control

Regardless of the spill source, the plan should consider the options available to minimise, control or stop the continual flow of oil into the environment. In the context of loss of well control this may involve an evaluation of the relative merits of intervention such as source capping, subsea containment or any other suitable technologies as they are developed.

All the available options for reducing or containing the volume of spilt oil should be considered so as to identify options that will reduce the consequence of the spill to the maximum extent practicable.

Description of intervention options

The WCCP shall include potential source control measures that could be taken to prevent further release or escalation of release of hydrocarbons. This may include measures that would be taken to stop the maximum anticipated discharge of liquid hydrocarbons from the reservoir, and an estimate of the maximum duration of the release. The latter could be a function of natural cessation related to the nature of the hydrocarbons and well flow characteristics, but will normally be the time taken to implement appropriate measures to stop or control the release (e.g. use of a capping or containment device), and the time taken to drill a relief well.

Where appropriate, details of plans to implement the capping of a well, and/or the drilling of a relief well to re-establish control of a well, should be included to demonstrate that there is adequate planning or provision in place for these eventualities. The level of detail provided in plans should be commensurate to the nature and specificity of the activity (e.g. for single exploration well drilled in a defined time period more specific planning will be possible than for multiple wells at a production installation operating on an on-going basis).

The plan should also provide a description of how the response activities will be coordinated between the operator, regulatory authorities, mutual aid partners and international spill support organisations.

Capping Devices

Where the use of a capping device is identified as a potential control option for a subsea well, operators must have suitable arrangements in place to implement such a response. The capping device must be suitable for the subject well, i.e. it can be deployed to attach to the well structure and used under the expected well pressure, and the source must be confirmed, including details of the nature of any contractual arrangements in place and relevant contractor contact details. The WCCP should also include relevant operator contact details, confirming who is responsible for securing the device and implementing the necessary arrangements for deployment in the event of an incident. Where operators and/or their contractors have specific source control plans relating to the use of capping devices, these should be referenced in the WCCP.

The WCCP should provide a clear breakdown of the anticipated timetable to take delivery of the equipment; to transport it to the well site; and to assemble; test and deploy the equipment to stop the flow from the well. This will inform the MNZ response and allow assessment of potential impacts during that period pending cessation of the release.

Relief Wells

Where drilling one or more relief wells is identified as a potential control option, operators must provide details of their plans to initiate the management of such an operation, including details of the operator contacts responsible for initiating the relief well plan, and contact details of contractors potentially involved in the operation should the need arise. Where relevant, confirmation should be provided of any communication or contracts with third party providers and how to proceed to access those

resources. It will also be necessary to confirm that consideration has been given to relief well design and location.

There should be a plan in place to source a Mobile Offshore Drilling Unit (MODU), if one would be required to drill a relief well/s. The type/s of MODU that would be appropriate should be identified. For exploration wells details should be included for any MODUs, or potential sources of MODUs, that have been identified in the event that the installation drilling the original well is not available. Again, where relevant, confirmation should be provided of any communication or contacts with third-party providers, so that the response personnel know how to proceed to access an appropriate MODU.

The WCCP should also provide a clear breakdown of the indicative timetable to source a MODU (including provision for suspension of any current operations), to relocate a MODU to the relief well site, and to drill the relief well and kill the original well. A brief explanation outlining the complexities and uncertainties associated with diverting a MODU, and the potential effects this could have on the timetable, should also be included.

Responsibilities of parties during a response

The WCCP should provide instruction on when and how the operator will seek assistance from other stakeholders and external responders, including any dependence on the availability of contractors and suppliers. The plan must outline the roles and responsibilities of these parties and where they fit in the emergency response structure.

Response Equipment and Services

The plan should identify critical equipment and services necessary to implement any identified intervention option. This may include, but is not limited to:

- relief well drilling rigs
- intervention equipment
- survey equipment
- contractors and suppliers
- transport facilities
- multipurpose service vessels
- other specially equipped emergency response vessels (i.e. supply vessels and aircraft);

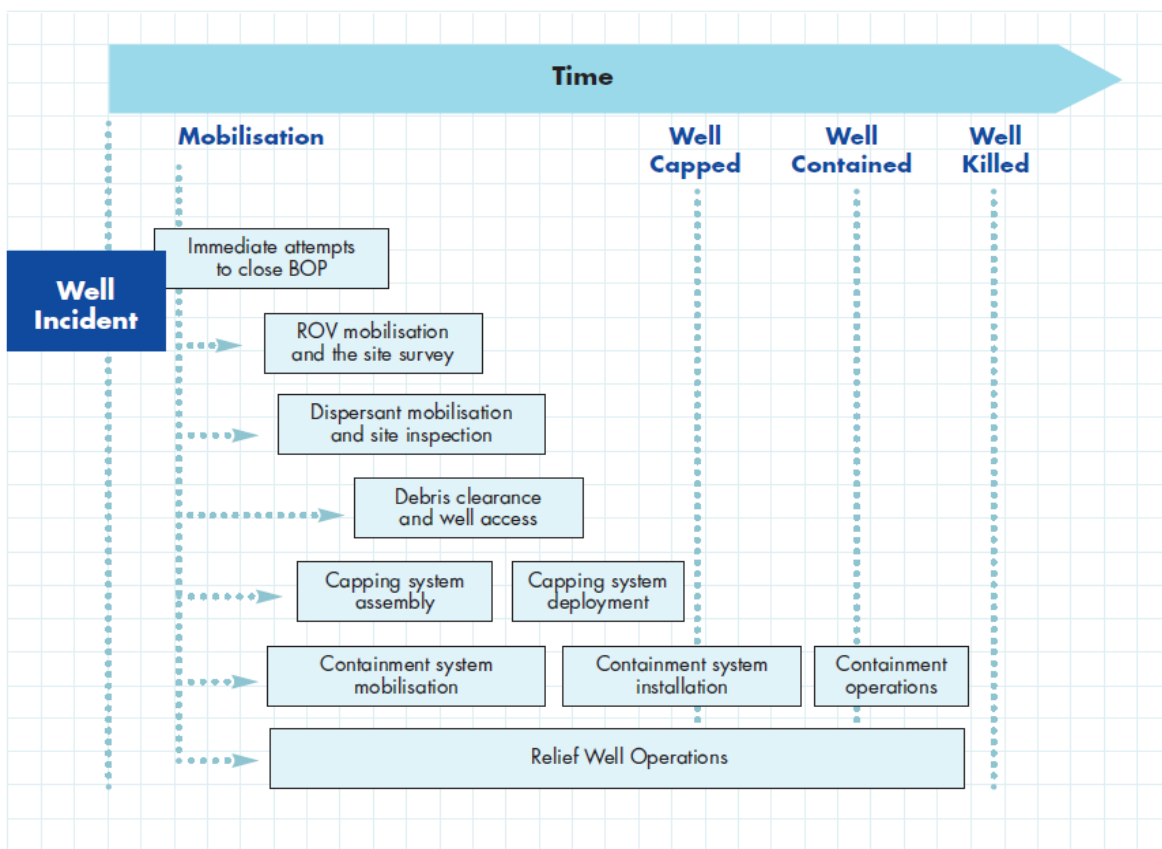
Mobilisation Plans

The WCCP shall include mobilisation plans for personnel, equipment, material and services identified as required for implementation of well control procedures. Operators should consider how they will mobilise equipment and personnel and the routes these resources will take to arrive on site.

Mobilisation timing

The mobilisation plans shall include an estimation of the time needed to mobilise and deploy equipment and services, from the notification of the uncontrolled hydrocarbon release, to the moment the well is under control (e.g. a cap or a full containment system is connected to the well and functioning, or a successful kill operation is undertaken from a relief well)

All incidents are different, and all responses will be specific to the incident. Figure 1 is an example of a generic chart used to outline intervention times, which in this case is a response to a loss of control of a subsea well during drilling operations.



Operators capacity to undertake proposed response activities

The WCCP should include information to provide assurance that operators have the capability to undertake all the response activities outlined in the plan. This may include, but not be limited to:

- The organisational management structure and associated personnel with the necessary skills and experience to cope with an incident of this significance and magnitude;
- Arrangements in place with key organisations identified to undertake any response activity; and
- Financial capacity to fund response activities.