



Gas Storage Facility

Well Control Emergency Response Plan

Gas Storage Facility ERP
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Prepared by Wild Well Control 



Call Wild Well Control for all well control emergencies. A Wild Well employee will answer your call 24 hours/day.

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Table of Contents

Table of Contents	1		
Confidentiality Statement	2		
Amendment Log	3		
Abbreviations and Acronyms	4		
Introduction	5		
Purpose.....	5		
Objectives	5		
Scope	6		
Plan Review & Exercises Overview.....	6		
▪ <i>Ongoing Management and Maintenance</i>	6		
Incident Response Levels.....	7		
Initial Response Actions	8		
Incident Level 1	8		
▪ <i>Specific Examples of Level 1 Incidents</i> :.....	8		
Incident Level 2	9		
▪ <i>Specific Examples of Level 2 Incidents</i> :.....	9		
Incident Level 3	10		
▪ <i>Specific examples of Level 3 incidents include</i> :.....	10		
Wild Well Initial Response	11		
Phases of Response	12		
Emergency Response Organization	13		
Well Control Emergency Response Teams.....	13		
Intervention Action Plan	14		
Immediate Response Actions (First 24 Hours)	14		
▪ <i>Monitor Well Conditions</i>	14		
		▪ <i>Exclusion Zone</i>	14
		▪ <i>Firefighting and Asset Protection</i>	14
		▪ <i>Implement Pollution Control Measures</i>	15
		▪ <i>Maintain Event Log</i>	15
		Interim Actions (Day 2-7).....	16
		▪ <i>Establish On-Site Command Post</i>	16
		▪ <i>Initial Evaluation and Information Gathering</i>	16
		▪ <i>Site Safety Plan</i>	17
		▪ <i>Asset Protection and Damage Control</i>	17
		▪ <i>Site Re-entry by ORT</i>	18
		▪ <i>Voluntary Well Ignition</i>	18
		Extended Actions (Until Completion).....	19
		Appendices	21
		▪ <i>Appendix A – Area Information and Logistics</i>	21
		▪ <i>Appendix B – Equipment and Services</i>	21
		▪ <i>Appendix C – Data Acquisition Forms</i>	21
		▪ <i>Appendix D – Response Techniques and Equipment</i>	21
		▪ <i>Appendix E – Incident Response Initial Actions Checklists</i>	21
		▪ <i>Appendix F – Intervention Action Plan Checklists</i> ..	21
		▪ <i>Appendix G – Site Safety</i>	21
		▪ <i>Appendix H – Relief Well</i>	21
		▪ <i>Appendix I – Exclusion Zones and Reentry</i>	21
		▪ <i>Appendix J – H₂S Operations</i>	21
		▪ <i>Appendix K – Voluntary Ignition</i>	21
		▪ <i>Appendix L – Environmental Considerations</i>	21

Confidentiality Statement

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Abbreviations and Acronyms

BHA	Bottom Hole Assembly
BOP	Blowout Preventer
CMT	Crisis Management Team
ERC	Emergency Response Center
ESD	Emergency Shutdown
FiFi	Firefighting
FRC	Fire-Resistant Clothing
ft	Foot, Feet
gpm	Gallons per Minute
H ₂ S	Hydrogen Sulfide
HSE	Health, Safety, and Environmental
IAP	Intervention Action Plan
LEL	Lower Explosive Limit
PIC	Person In Charge
PPE	Personal Protective Equipment
ppg	Pounds per Gallon
ppm	Parts per Million
psi	Pounds per Square Inch
WCERP	Well Control Emergency Response Plan



1

Introduction

Purpose

Procedures for handling emergencies are absolutely essential to ensure the protection of life, the environment, and property. Wild Well Control (WW) has developed this Well Control Emergency Response Plan (WCERP) for Peoples. Its purpose is to establish a reliable framework for managing the activities required to regain control of a well.

The equipment and procedures specified address various well control scenarios ranging from routine well control operations to situations involving a total loss of well control necessitating the immediate mobilization of intervention equipment and personnel.

Objectives

The primary objective is to establish a process for responding to and safely managing well control emergencies using a standard, uniform approach. This process includes the following responsibilities:

- Protect the personnel at the site in the event of a well control emergency.
- Define the notification protocols and methods.
- Prevent personal injury, minimize environmental impact, or facility damage while adequate equipment and personnel are being mobilized.
- Define the critical information that is required to determine the appropriate response level and strategy.
- Organize personnel and provide guidelines for their role in the emergency response and subsequent management.
- Pre-select source locations for personnel, equipment, material, and services typically required for implementation of well control procedures.

The WCERP is not intended to replace sound judgment. Modification of the mobilization plan and intervention strategy may be necessary depending on the circumstances of the incident.

Well control incidents require common sense and professional judgment by the Person(s) in Charge (PIC) of operations, and no operation should be undertaken if it involves unreasonable risk to personnel.

Accurate information is essential to implement an effective well control incident management system. Recommendations are included for the information to be gathered at the well site and from office records.

Scope

The WCERP encompasses the Peoples operations in Pennsylvania. The WCERP covers the response organizations that would be necessary to respond to an incident at these locations.

This plan covers the activities required to assess the blowout incident, develop an intervention plan, and execute response measures to ultimately regain control of the well.

It should also be an integral part of an overall “Emergency Response Plan.” Where necessary it shall refer to the relevant emergency procedures and contingency plans already included in the overall “Emergency Response Plan.”

The following items are typically covered in the overall “Emergency Response Plan” and therefore are not included in this WCERP:

- **Communication procedure with local authorities, partners, families, and the media**
- **The procedures for contracting, administration, procurement, etc.**

Plan Review & Exercises Overview

In order for this WCERP to preserve its primary objective of establishing a process for responding to and safely managing well control emergencies, it must maintain accurate and up to date information.

Ongoing Management and Maintenance

Ongoing management and maintenance of the WCERP is critical to its utility as an effective tool to help mitigate well control incidents. It must be kept current to the project’s needs. Document changes should be tracked by the Standards and Compliance Director.

WCERP review timing will be aligned with the PNG guideline. This review should be at intervals not exceeding fifteen (15) months, but at least once each calendar year.

Incident Response Levels

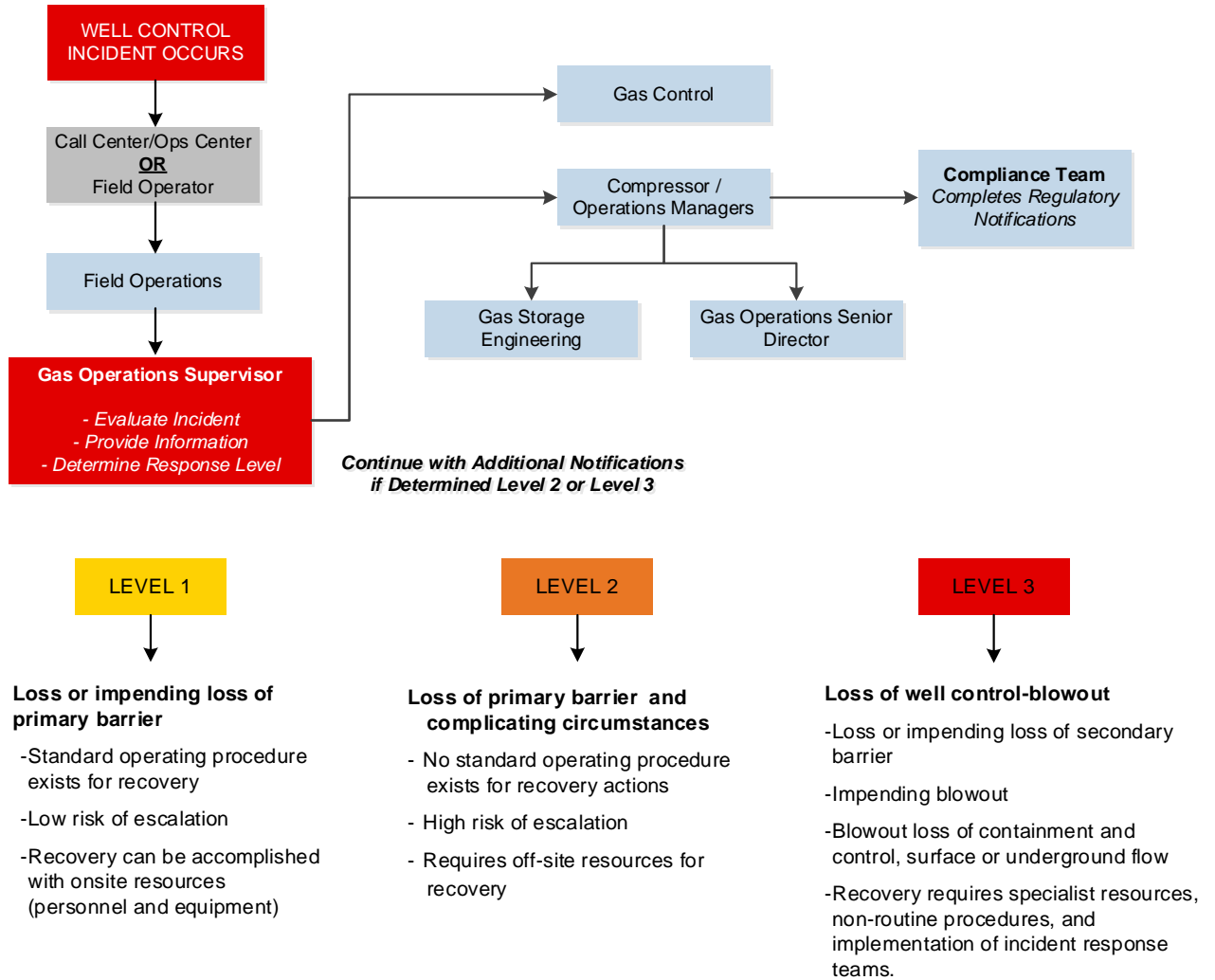


Figure 1.1 – Incident Response Levels

2 Initial Response Actions

Refer to Appendix E – Incident Response Initial Actions Checklists, for detailed response actions.

Incident Level 1

A Level 1 incident involves circumstances that are either common to routine operations or do not pose significant risk to personnel. In most instances, can be resolved using commonly available equipment, personnel, and techniques.

Specific Examples of Level 1 Incidents:

- Loss of flow string integrity, resulting in sustained pressure on production casing less than 50 percent of casing burst rating
- Loss of any exposed casing or liner integrity, resulting in sustained pressure on intermediate casing less than 25 percent of casing burst rating
- Minor surface leaks that can be isolated remotely or accessed and isolated manually without significant risk to personnel
- Unable to kill live well to start coiled tubing or electric line services.
- Failure of wellhead seals and downhole equipment.
- Lubricator leaks prior to wireline operation.

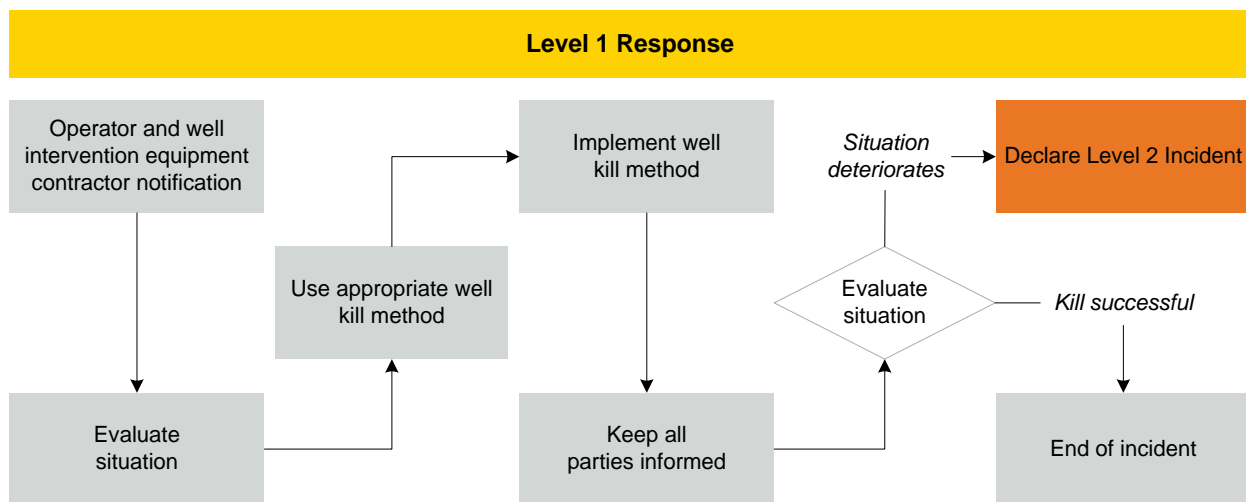


Figure 2.1 – Typical Level 1 Response Flowchart

Incident Level 2

A Level 2 incident involves circumstances that are not commonly encountered during routine operations; pose the potential for significant risk to personnel, equipment, or the environment, and require specialized personnel, equipment, and/or techniques to resolve safely.

Specific Examples of Level 2 Incidents:

Surface Leaks

- Small surface leaks that cannot be easily or safely isolated
- Wellhead Seal Failures

Nonstandard Incidents

- Incidents that require unconventional well control such as bullheading, volumetric, or lubricate and bleed
- Wireline or Coiled-Tubing equipment stuck across wellbore isolation valves in tree
- Fishing operations performed under pressure using coiled tubing
- Swabbing influxes while performing coiled tubing or wireline operations

Equipment Failures or Pressures in Excess of Ratings

- Damage to or erosion of surface pressure control equipment such as valves, chokes, lubricators, etc
- Loss of flow string integrity resulting in sustained pressure greater than 50 percent of casing burst rating. This includes failure of wellhead seals and downhole equipment.
- Loss of next outer casing integrity resulting in sustained pressure on intermediate casing greater than 25 percent of casing burst rating. This includes failure of wellhead seals.
- Loss of protective casing integrity resulting in sustained pressure on surface casing (any pressure)
- Coil Tubing which has been sheared during a well control operation
- Complications in the functioning of the Wireline Lubricator, Wireline BOP, or Coiled Tubing BOP, that could affect the pressure isolation of the well.

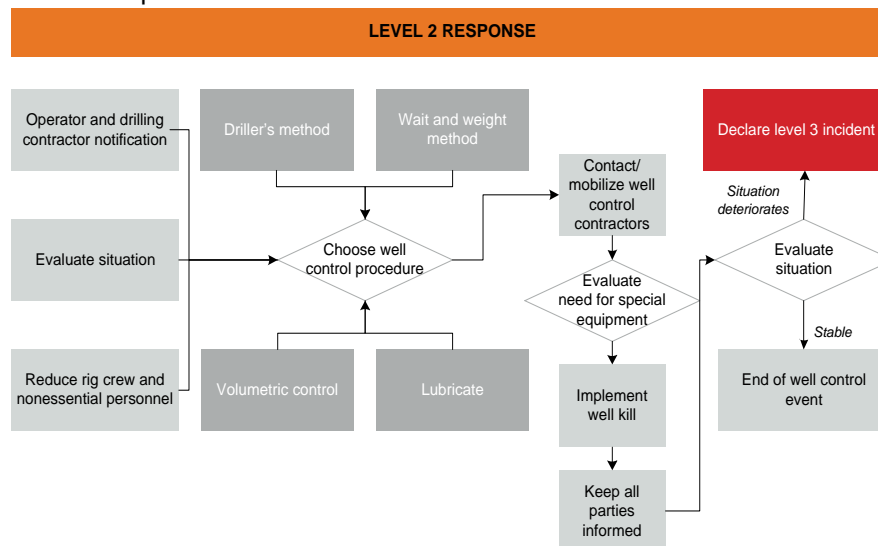


Figure 2.2 – Typical Level 2 Response Flowchart

Incident Level 3

Level 3 incidents are those in which control of the well has been lost. Level 3 incidents present serious risks to personnel, environment, and assets. These incidents require the immediate application of specialized techniques and use of a thorough well-developed site safety plan.

Specific examples of Level 3 incidents include:

Blowout and Leaks

- Surface blowout (with or without fire)
- Broaching of uncontrolled formation fluids to surface near the well or in the well bay area.
- Equipment leak with tools stuck across wellhead, production tree valves, or BOPs.
- Significant leak at wellhead or BOP

Equipment Failures or Pressures in Excess of Ratings

- Surface pressure beyond the pressure rating of equipment (including tubulars)
- Mechanical or functional failure of the wellhead, production tree valves, or BOP
- Inability to close in additional safety systems (i.e. BOPs, etc.).
- Tubing hanger leak

Evacuations and Dangerous Conditions

- Any incident that requires evacuation or partial evacuation of the gas storage facilities
- Any incident that constitutes a clear and present danger to personnel, environment, or equipment that cannot be resolved by conventional means
- Incidents in which levels of H₂S exceed 10 ppm, gas readings approach or exceed 10 percent LEL, noise levels increase toward levels that will affect personnel safety, or pressure levels approach levels that will threaten equipment integrity

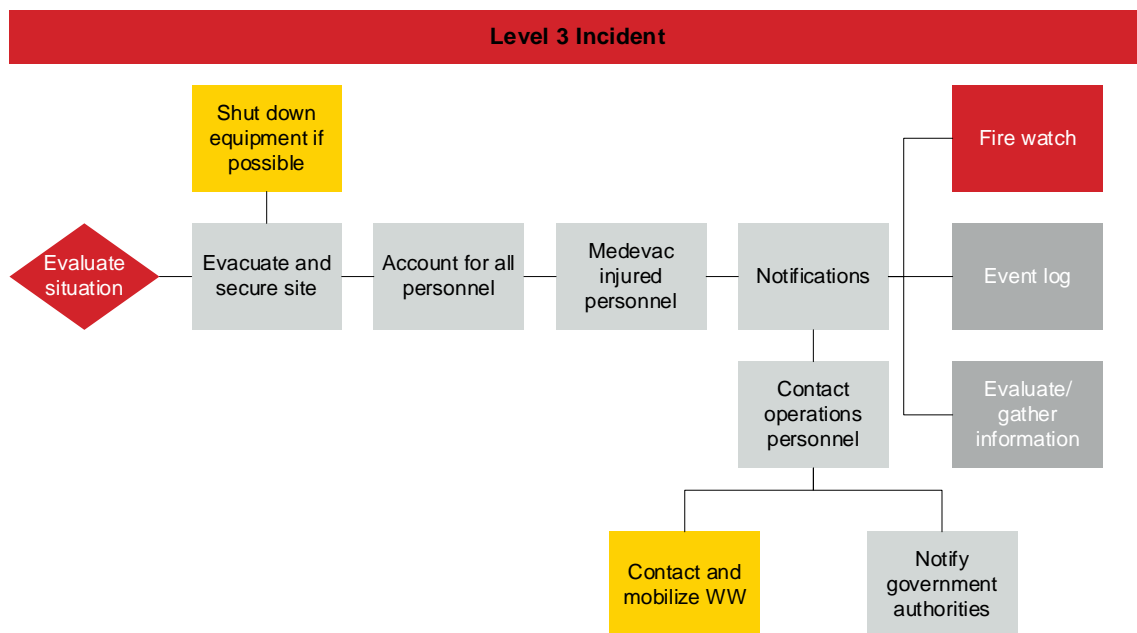


Figure 2.3 – Typical Level 3 Response Flowchart

Wild Well Initial Response

Wild Well will initiate the response upon notification of a well control event. Peoples will notify Wild Well to mobilize personnel and equipment to the operations area. The initial actions by Wild Well will vary in response to the specific incident in regards to both personnel and equipment.

Wild Well Control

- Gather Initial Incident Data
- Mobilize Initial Personnel to location. Headcount will vary in accordance with the incident assessment
 - ✓ 1 Well Control Engineer to location
 - ✓ 2+ Operations Specialist to location
 - ✓ 1 Well Control Engineer to Corporate location
 - ✓ Optional: HSE Specialist and Environmental Advisor to location, additional engineers and operations personnel will be mobilized depending on the severity of the incident
- Equipment mobilization from the nearest People's operations or Contractor's facility
 - ✓ Mobilization will be via land or air depending on incident location and equipment loadout.

3 Phases of Response

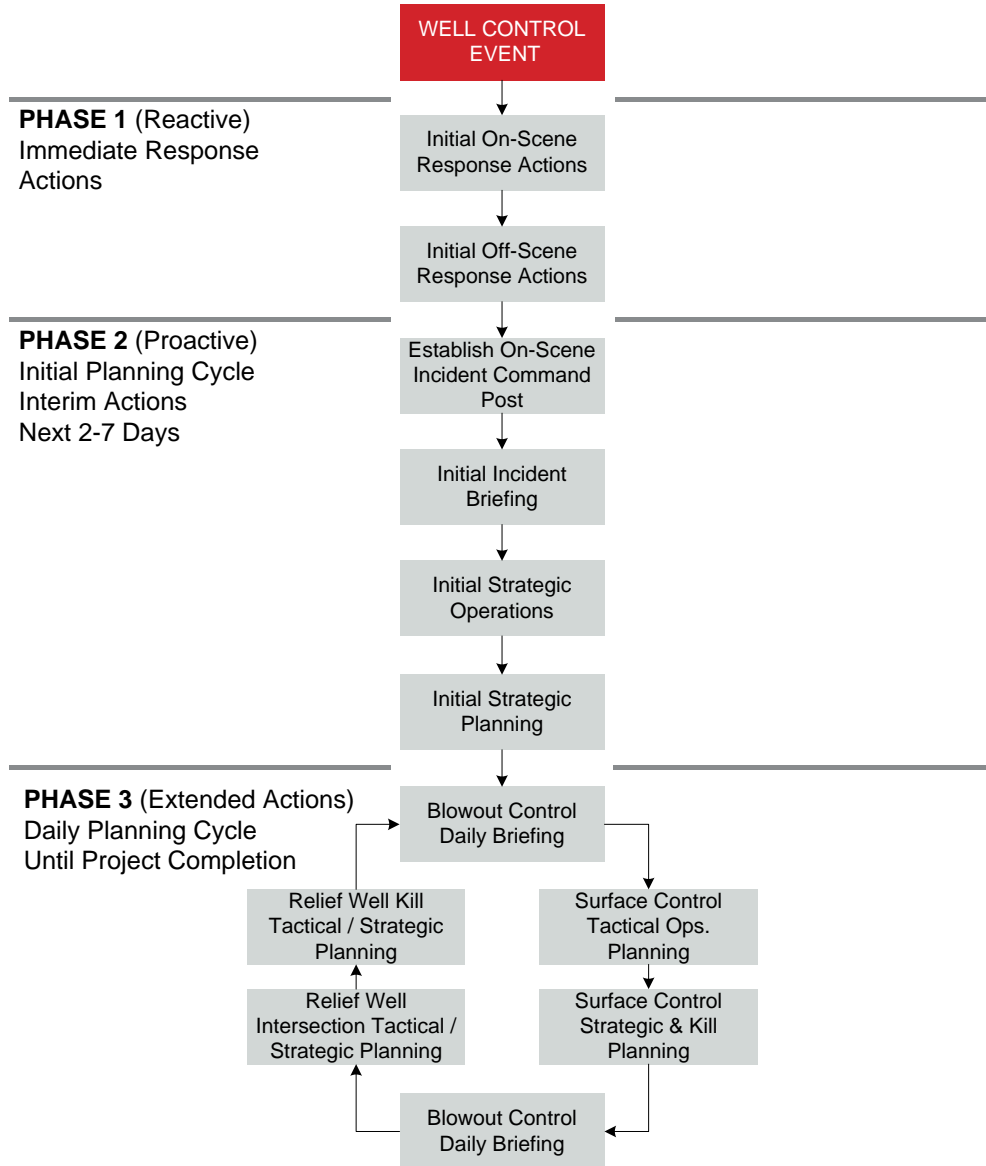


Figure 3.1 – Phases of Response Chart

4

Emergency Response Organization

Well Control Emergency Response Teams

Reference PNG ERP Contact Table for personnel contact information and positions/titles.

5

Intervention Action Plan

This section details an action plan for a Level 3 event (or possibly a Level 2 with significant probability of escalation). Response actions are to be initiated as quickly as possible but should never interfere with or take priority over the safety of anyone affected by the well control incident.

Intervention activities will be dictated by the severity and magnitude of the well control event. This action plan should not replace clear thinking; it is only a guideline. This action plan is only a guideline intended to fit most major scenarios, but the circumstances of the event could require modifications to this plan.

Response to well control incidents is divided into three key phases:

- Immediate Response Actions (first 24 hours)
- Interim Actions (day 2 to day 7)
- Extended Actions (until completion)

Refer to Appendix F – Intervention Action Plan Checklists, for detailed response actions.

Immediate Response Actions (First 24 Hours)

Monitor Well Conditions

Appoint a pad/site crew member to conduct periodic / regular checks on the well from a safe location outside the hot zone and record all changes in the flow at the wellhead. Recorded changes should include changes in flow, noise, etc. The collected information will be important to the well control specialists/engineers in completing their investigation and analysis of the situation.

Exclusion Zone

The initial exclusion zone should be a fixed radius around the blowout exit point(s). The fixed radius should be based on a worst-case blowout considering:

- Maximum gas flow rate.
- LEL distances for very stable atmospheric conditions and light wind (less than 2 mph).

If modeling parameters are uncertain, assume ½ mile as a minimum initial radius. Once air monitoring equipment is available, air quality measurement will be used to alter the initial exclusion zone.

Firefighting and Asset Protection

- Firefighting should only be attempted if it does not compromise the safety of personnel.
- All firefighting equipment should be positioned to direct water onto the structure under the supervision of the OSC.
- Consideration must be given to wind direction and at no time should the equipment be placed in a position that would compromise safety should the well unexpectedly ignite or the structure collapse.
- If on fire, apply firewater to protect the pad/site structure, production facilities, and adjacent wellheads.
- If not on fire, apply firewater to prevent ignition (unless voluntary ignition is warranted due to pollution or poisonous gases).

Implement Pollution Control Measures

A fluid containment plan should be developed with the well control specialists/engineers and environmental control specialists and implemented as quickly as possible.

Maintain Event Log

Video and photographic records should also be maintained. For security reasons, all logs and photographic records shall be kept confidential. Only authorized personnel shall be responsible for collecting event log documentation and/or releasing information.

Interim Actions (Day 2-7)

Establish On-Site Command Post

An On-Site Command Post (OSCP) needs to be established by the OSC as soon as practical to facilitate coordination of further response activities. If the pad/site has been abandoned, the command post must be established outside the exclusion zone. Good communication equipment is essential between the OSC, the field support resources, and the ERC. The location of the command post may be moved as appropriate at the discretion of the OSC. The following items shall be provided in the command post:

- Laptop computer(s) with necessary software installed and internet connection
- White boards to be used as status boards
- Necessary stationery including board pins and magnets
- Digital cameras with video feature
- Portable printer, fax and scanner
- Multi - gas detectors
- Heat radiation meter
- Decibel meter
- Appropriate PPE
- Speaker phone
- Source of power, including backup power (grid, generator and/or batteries)
- Two-way intrinsically safe radios
- Booster or satellite phones in areas where cell phone reception is weak

Initial Evaluation and Information Gathering

Certain information is crucial in developing an effective intervention plan and immediate response. This duty will fall upon the company and contractor personnel at the site. The following information should be gathered and documented so that it can be passed on to well control specialists:

- Operation at the time of the incident
- Last observed pressures
- Present configuration of the well bore – casing, workstring, packers, depths, geology, fluids, etc.
- Lithologic column, mud log, PPF plot
- Wellhead info – details, schematics
- BOP / lubricator equipment in use at the time of the incident – position of all rams, BOP status, and safety valves, etc.
- Last known status of wellhead or BOP components – open, closed, locked, damaged, etc.
- Pad equipment shutdown level initiated
- Well control actions implemented
- Estimate of flow rates and flow characteristics (gas and water)
- Extent of equipment damage
- Other information as dictated by the situation

The information from the initial evaluation will be conveyed to well control company for planning purposes and should be included in the records.

In the initial stages, the information will be used to determine the feasibility of a quick resolution (i.e., pumping kill fluids, bridging agents, etc.) if it exists. If possible, this should be done before the situation deteriorates, eliminating this type of intervention.

Refer to Appendix C for the Well Control Incident Data Sheet.

Site Safety Plan

After evacuations and the other initial command structure steps are taken by the OSC, ongoing site safety should be addressed. For a Level 3 well control incident, the ORT and well control specialists (if available) will develop a Site Safety Plan immediately and submit it to the WCERT. The plan will identify the hazards present on the site/pad and will define site control boundaries, including SAFE ZONE and HOT ZONE boundaries, and control access to the incident area.

Common health and safety hazards on a blowout include:

- Radiant heat
- Explosive and toxic gas concentrations
- Explosive materials (perforating charges, prima cord, etc.)
- Compressed substances (acetylene, oxygen, etc.)
- Hazardous chemicals
- Dangerous noise levels
- Structural damage
- Leaking gas or fluids

Refer to Appendix G for a guidance regarding the contents of the Site Safety Plan.

Asset Protection and Damage Control

After the site safety issues are addressed, asset protection and damage control may be addressed by the OSC:

- Firewater application/deluge systems to minimize ignition hazard or to cool structure and/or adjacent wells (if appropriate).
- Non-essential crew should be removed before entry into the Hot or Warm Zone. All safety equipment and breathing systems must be checked before entry.

Action or Consideration

None of the below actions should be taken if personnel safety cannot be maintained at all times

1. Initial firefighting and asset protection should start at the wellhead and expand to the locally available firefighting units.
2. Use fire hoses to keep fire away from personnel if necessary during evacuation (if equipped and feasible).
3. Establish "Hot Zone" & "Safe Zone".
4. Establish Hot Zone Access & Egress Control.
5. Mobilize locally available mobile fighting equipment.
6. Local firewater capability must not wait for blowout specialists to arrive as fire damage to the structure, surrounding wells and process equipment must be quickly limited:
 - » Spray water to protect adjacent wellhead areas and production equipment.
 - » Blow down all production lines and displace with nitrogen or water if possible.
 - » Confirm that all adjacent wells are shut-in on subsurface safety valve and surface valves. If possible kill offset wells.
 - » Displace storage vessels with water, nitrogen, or any non-combustible materials. Remove any stored chemicals or pressurized containers. Even fire extinguishers can blow up if they get too hot.
 - » ***Spray water only on those areas that are too hot.***

Site Re-entry by ORT

Re-entry of the site where a surface blowout is underway should not be attempted by the ORT without approval from management. The case of search and rescue may be accepted as an exception, but only after a detailed safety/rescue plan is in place for the responders. For all other purposes (e.g. assessment or mitigation) the ORT should wait for the well control specialists to arrive and develop a detailed plan.

Voluntary Well Ignition

Voluntary well ignition will generally only be considered if there are significant concentrations of oil, toxic gas (H₂S, SO₂ etc.), or other pollution resulting from the blowout. Each incident is unique. Voluntary well ignition is a complicated subject which must be discussed with the well control specialists.

Extended Actions (Until Completion)

If a well control incident cannot be remediated by interim measures and is expected to last for an extended duration, the well control emergency response plan will need to make an orderly transition to a long-term sustainable focus (daily planning cycle). This may involve major shifts in responsibility and authority to other groups or organizations better suited in terms of resources or expertise to address the ongoing nature of the event. Principles to follow during the transition include:

- Work as a team to facilitate the best solution for resolving the incident
- Observe all safety and environmental policies, procedures and practices
- Obey company guidelines/expectations for ethical and honest practices
- Fully document decisions and transfers of roles and responsibility
- Follow instructions and perform new roles as expected
- Preserve all data and information that has been generated to this point
- Collect and organize materials for efficient access in the future.

Crisis Management Team Leader Duties & Responsibilities

- Function as Crisis Management Team Leader
- Make decision to activate CMT with input from Director Gas Storage or Incident Commander
- Customize the CMT with the most appropriate and available managers
- Institute the need for longer-term support as the well control emergency continues, ensuring adequate personnel for both day and night teams.
- Incident needs to transition from an emergency basis to a longer-term sustainable effort
- Notify the Leadership Team that the incident can be better resolved in a project rather than emergency mode. Factors include: available resources, better expertise, advanced techniques, and diversion from primary role
- Develop transition strategy in conjunction with internal and external resources
- Use all available resources to safely carry out each phase of the intervention plan
- Monitor the transition and inform stakeholders as to the progress
- Notify Company Management and resolve issues as they arise
- Continue incident support until transition is complete
- Ensure that all responsibilities are transferred and accepted, as planned
- Ensure that any follow-up issues are addressed
- Brainstorm and prioritize the key strategic issues and develop strategies. Strategically manage life, property, and environmental tasks in conjunction with the affected line of business
- Identify key stakeholders
- Implement strategy by making direct and indirect contact with stakeholders to regain control of the issues and commercial position
- Continually find and check the facts concerning life, property, environment, business continuity, liability, and reputation

Appendices


Appendix A – Area Information and Logistics

Area Information and Logistics (Click to Open) 

Appendix B – Equipment and Services

Equipment and Services (Click to Open) 


Appendix C – Data Acquisition Forms

Data Acquisition Forms (Click to Open) 


Appendix D – Response Techniques and Equipment

Response Techniques and Equipment (Click to Open) 

Appendix E – Incident Response Initial Actions Checklists

Incident Response Initial Actions Checklists (Click to Open) 

Appendix F – Intervention Action Plan Checklists

Intervention Action Plan Checklists (Click to Open) 


Appendix G – Site Safety

Site Safety (Click to Open) 


Appendix H – Relief Well

Relief Well (Click to Open) 


Appendix I – Exclusion Zones and Reentry

Exclusion Zones and Reentry (Click to Open) 

Appendix J – H₂S Operations

H₂S Operations (Click to Open) 

Appendix K – Voluntary Ignition

Voluntary Ignition (Click to Open) 

Appendix L – Environmental Considerations

Environmental Considerations (Click to Open) 