



PPC REGULATED PLANS FOR FIFE NGL PLANT:

- **START-UP & SHUT-DOWN PLAN**
- **INCIDENT PREVENTION & MITIGATION PLAN**
- **DECOMMISSIONING PLAN**

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INTRODUCTION

Shell UK Limited commissioned and has operated the Mossmorran Fractionation Plant since 1984 at Mossmorran, Cowdenbeath, Fife. The plant, as a major petrochemical installation, has been subject to a significant set of controls, both internal Shell standards and external regulatory standards, since its inception and throughout the operation of the plant and as a consequence has built up a comprehensive set of procedures and plans that ensure safety and minimise the environmental impact of the plant.

The Pollution Prevention and Control (Scotland) Regulations determine that certain prescribed processes are required to have a permit to operate.

The Mossmorran Fractionation Plant conducts a number of processes on the installation that are subject to the Pollution and Prevention and Control Scotland Regulations (PPC) and is regulated under PPC permit number PPC/A/1013495.

This report addresses the following PPC permit requirements:

Section 2.4.7 By the 31st March 2008 the Operator shall prepare, implement and maintain an 'Incident Prevention and Mitigation Plan'

Section 2.8.1 By the 31st March 2008 the Operator shall implement and maintain a plan ('the Start-up Plan') setting out the necessary steps to be taken by the Operator prior to Start-up of operations of the Permitted Installation to ensure that all appropriate preventative measure are taken against pollution and that no significant pollution is caused.

Section 2.9.1 By the 31st March 2009 the Operator shall prepare and maintain a plan ('the Decommissioning Plan') for the decommissioning of the Permitted Installation. The Decommissioning Plan shall set out the steps to be taken by the Operator after final cessation of the Permitted Activities.

The Mossmorran Plant, as an installation handling large quantity of flammable gases, must be operated in a responsible manner with all appropriate actions taken to minimise the inherent risks in the plant. This and the fact that the installation has been in operation since 1984 and has been regulated under a various pollution control regime since first operational, as well as the longer standing Health and Safety at Work Act 1974, has led to detailed process controls, operations and procedures to have but put into place at the plant.

The controls in place adequately perform the functions of the plans required by PPC permit. This report comprises the response to each of these permit sections and details the documents that perform the functions required by the permit. The documents mentioned within the report should be consulted for the detail of the actions to be taken and considered as part of the relevant plan.

START-UP AND SHUT-DOWN PLANS

Introduction

Start-up and Shut-down of the operations at the plant is acknowledged to be both complex. The nature of the flammable substances held and processed within the plant has demanded that rigorous controls are in place to prevent accidents occurring on the installation. Legislative control focussing on the operation of the plant not only includes the PPC regulations but also Health and Safety at Work Act 1974 (HSW) and the wide range regulations and controls that have been enacted under the HSW.

The HSW requires that it is the employer's duty to ensure *'the provision and maintenance of plant and systems of work that are, so far as reasonably practicable, safe and without risks to health'*. The HSW originally included the duty to control the emission of *'noxious or offensive substances and for rendering harmless and inoffensive such substances as may be so emitted'*. The powers of this section were however transferred to and strengthened by the Environmental Protection Act 1990 and by the PPC Regulations.

Consequently, the controls over the Start-up / Shut-down operations at the Mossmorran installation provide detailed instruction on how operations are conducted.

As previously described, condition 2.8.1 of the PPC Permit requires that a Start-up plan is implemented and maintained. In addition, condition 2.8.2 requires that *'At least every four years, the Operator shall review the Start-up Plan required under this condition. Each review of the said Start-up Plan shall be recorded and where the Operator makes any revision to the said plan, said revisions shall be recorded'*.

General Philosophy

Start-up of each section of the plant is closely directed by the control room operating to detailed instructions contained within written procedures. The procedures follow a repeated pattern of initially carrying out a complete suite of checks to ensure that the plant is set up correctly to receive hydrocarbons. Once the set of checks have been completed and appropriate blanks put in place and removed nitrogen is fed into the process plant and the plant pressurised. The plant is then repeatedly depressurised and pressurised until the oxygen content of the gas within the system is below set safety levels. Once the plant has been purged of air the plant is set for the receipt of ethane. The plant is gradually purged of nitrogen to flare by the repeated pressurisation and depressurisation of the plant with ethane. Each sequence goes to flare for disposal of the ethane / nitrogen mix. This involves firing up of the hot oil heater system and the gradual warming up of the process vessels followed by the gradual introduction of Natural Gas Liquid (NGL) feedstock and the cooling of lines to operating temperature in the case of plant handling liquefied gases. As the feedstock moves through the system the next series of components of process plant are brought on stream.

The procedures are split into major plant sections and are contained within the Plant General Procedures Manuals. The plant sections include both specific processing units and the support

services. Each of the plant sections holds considerable detail of the operational controls and procedures that are undertaken during the course of the plant operation.

Individual aspects of operation are then covered by procedures specific to plant sections and services. The operatives take actions in accordance with the instructions in the procedures for the Start-up of the relevant plant sections. The responsibility for the control of the operatives rests with Operations Control Facility.

The plant procedures are split into fifteen main sections. The splits are in line with the main production units and the main support services, which are common to each. Each section unit of Mossmorran has a specific module Start-Up procedure to ensure that after an 'abnormal' condition in any portion of the plant there is a set procedure for starting that unit to support all operations of the plant safely. These may then be further sub-divided if the plant section structure warrants it. Shutdown also has a specific set of controls.

Plant Processing Units

Process Units typically have a large number of detailed, hands-on 'Action' procedures to align the system for proper operations. Each system is 'Aligned' in the plant by the field technician and radio communicated to the Operations Control Room to initiate power. This structure is repeated for all of the plant sections and services. For a number of units the Start-up and shutdown procedures are referred to as isolation and reinstatement procedures.

UNIT 1000 – Fractionation System:

The fractionation system controls the separation of the ethane, propane and butane. Within the operation manual five procedures deal with the Start-up and Shut-down, these are;

- PROCEDURE NO 7/015 MODULE START-UP PRE-START CHECKS
- PROCEDURE NO 7/016 NITROGEN PURGING
- PROCEDURE NO 7/017 HYDROCARBON PURGING
- PROCEDURE NO 7/018 MODULAR START-UP
- PROCEDURE NO 7/019 SHUTDOWN AND HYDROCARBON FREEING A MODULE FOR MAINTENANCE

Similar procedures also follow for the following units – but are not listed below for clarity.

UNIT 1300 – Propane Treatment (Doc 7503-013):

The purpose of Unit 1300 (modular) is to remove methanol. Undesirable sulphur compounds from the propane product including hydrogen sulphide (H_2S) are also removed.

UNIT 3200 – Propane Storage and Loading (Doc 7503-032):

The Mossmorran NGL feedstock contains approximately 34% by mass of the commercial propane product, which is produced as an overhead vapour from the three modular de-propaniser columns.

UNIT 3300 – Butane Storage and Loading (Doc 7503-033)

The Mossmorran plant produces a feedstock that contains approximately 15% commercial butane product, which is produced as an overhead vapour from the three modular debutaniser columns.

UNIT 3400 – Gasoline Storage and Loading (Doc 7503-034):

Natural gasoline is produced from the bottom of each de-butaniser column. It is cooled and stored in two floating roof storage tanks. Once a sufficient parcel is accumulated, it is loaded on to sea going vessels at Braefoot Bay.

Support System Equipment

Below is a listing of the support system equipment. Each unit includes Module Start-up and Shutdown procedures similar to the illustration within the U1000 – Fractionation System. These units are critical to the efficient and safe operation of the entire plant and NGL production.

Fife NGL Instrument Air System (Doc 7503 – 102):

The plant instrument air system provides continuous, constant pressure supply of clean dry compressed air to operate the control and emergency equipment located within the process modules, the product tank areas, the utility units, and the fire protection system.

UNIT 1500 – Refrigeration Facilities (Doc 7505-015):

To achieve the required refrigeration temperatures for cooling of process gases, a basic two stage vapour compression system is employed. Compressors utilise stored propane product as a refrigerant to keep gases cool and safe to use in process equipment.

UNIT 3000 – Inlet Facilities and Metering (Doc 7503-030):

The NGL feed-stream originates in gas produced from the offshore North Sea Basin gathering system. The natural gas liquids are transported safely through the pipeline systems as they enter the inlet facilities and metering stations of the plant. Safe Start-up of the meters is crucial in accurate accounting for the production NGL entering the plant.

UNIT 5000 – Electrical Distribution (Doc 7503-102B):

Unit 5000 covers the electrical supply and distribution system for plant instrumentation and control equipment. As the plant is entirely dependent upon a reliable electric power grid, facilities have been included to ensure that an emergency power supply in the event of a power failure that would interrupt safe plant operations.

UNIT- 5300 – Drainage System (Doc 7503-102A):

Plant drainage system relies on three operational systems. First is the surface water system and commonly referred to as the 'Accidentally Oil Contaminated' system (AOC). The second system is the 'Continually Oil Contaminated' system (COC). Lastly is the plant sewage system. The COC stream is treated in a titled plate separator before it joins the AOC stream and is further treated in the Y-trap before release into the burn via the fire pond. The latter stream is sampled to ensure it meets SEPA requirements. Sewage is transferred to the Exxon plant for treatment.

UNIT- 5300 – Fuel Gas System (Doc 7503-102D):

Fuel gas used is methane taken from the grid system. Ethane and propane, which are products of the plant can also be used. This fuel is used for several pieces of gas fired production process equipment.

UNIT 5500 – Hot Oil System (Doc 7503-055):

The purpose of Unit 5500 is to supply the plant with a continuous source of heated oil. The supply of heated oil is input into the multi-stage fractionation process to maintain safe plant operations for the multitude of equipment requiring this heated liquid to perform efficiently.

UNIT 5600 – Nitrogen Supply (Doc 7503-102F):

The purpose of Unit 5600 is to provide an adequate supply of nitrogen gas to the plant. The nitrogen is required to purge air from all process piping and equipment prior to the introduction of flammable hydrocarbon liquids and vapours during plant Start-up operations. It is also used to purge the flares continuously.

UNIT 7000 – Hydrocarbon Relief Facilities (Doc 7503-070):

The NGL plant could be damaged if subjected to overpressure when receiving product through the pipeline delivery system. To protect them, they are fitted with relief and de-pressurisation valves to remove excess hydrocarbon. The excess hydrocarbon goes to the flare system which is a vital part the plant safety system.

UNIT 7100 – Fire Fighting Facilities (Doc 7503-071A):

The Plant contains large quantities of highly volatile hydrocarbon, all of which are capable of forming explosive mixtures when mixed with air. In the event that a leak should occur at Mossmorran, and a fire ensue, the facilities of Unit 7100, the fire protection system, are designed to cope with the emergency.

Operational Control of the Start-Up Procedures and Actions

Operational control of the Start-up of plant is handled by the on-site control centre. From the control centre, operatives are dispatched to the relevant plant areas. The operative's actions are coordinated and sequenced from the control centre to ensure a safe Start-up. The responsibility for the Start-up remains with the Operations Control Facility.

Mossmorran Fractionation Plant Operations Control Facility

The Mossmorran Operations Control Facility sits in the Southeast section of the plant. The explosion proof compound houses the plants SCADA telemetry control room and highly trained operators overseeing the plant operation on a 24/7 schedule. Control Room Operators (CRO) are given extensive training to become certified; this training ensures they understand plant processes for start-up/shut-down, and emergency response and must be completed prior to "standing alone" as a CRO. Plant technicians are available to respond to potential emergencies from the control room at the Control Room Operator's request.

The daily control room duties are outlined in the Fife NGL Plant General Operating and Control Room Duties Manual. These duties include;

- Shift supervisor coverage
- Standards applying to shift change logs and handovers
- Testing sequence of alarms and trip overrides
- Equipment maximum and minimum operating temperature conditions

- Reporting of plant performance statistics
- Procedure for determining fugitive emissions
- Handling process gas leaks
- CO₂ handling procedures

Twice per year the CRO performs the Operations Procedures Review. This keeps the operators abreast of changes in the plant operations scheme. Each Supervisor and shift team are required to review and understand all the procedures allocated to them including;

- Technical content
- Environmental impact
- Safety consideration

The Mossmorran Operations Procedures Manual addresses specific plant process equipment with detailed operating procedures. CRO'S have extracted a Plant Upset/Event Recovery Guide from this manual in order to expedite starting/stopping the various units in a timely manner. This guide covers various plant events with a list intended to remind the CRO of the salient points. Some of those units are;

- | | |
|----------------------|---------------------------------|
| • Total Loss of Feed | • Refrigeration Compressor Trip |
| • Furnace Trip | • Hot Oil Pump Stoppage |
| • Pipeline Emergency | • Recovery ESD Total/Modular |

In conjunction with the Operations Procedure Manual is the Constraint Handling and Energy Optimism Guide. This handbook directs the CRO in methods to address energy conservation under optimal plant operating mode. The guide covers various plant constraint handling method events, with a list of bullet points to optimise energy consumption of plant process equipment to reduce energy and plant maintenance costs.

INCIDENT PREVENTION AND MITIGATION PLANS

Introduction

Condition 2.4.7 of the PPC Permit requires that *'the Operator shall implement and maintain an 'Incident Prevention and Mitigation Plan'.*' In addition to the requirements of the PPC Permit, the Mossmorran installation is also required to comply with other legislation and standards that control the prevention and mitigation of incidents.

Legislation and Standards

The Mossmorran installation is regulated by the Control of Major Accident Hazard (CoMAH) Regulations 2015. The site is classed as Upper Tier CoMAH due the storage of large quantities of extremely flammable gases (propane and butane) and gasoline. The CoMAH regulations require that the site has;

- identified major accidents hazards;
- has taken measures to prevent major accidents and to limit their consequences to people and the environment;
- that safety and reliability have been incorporated into the design, construction;
- operation and maintenance linked to major accident hazards; and
- on-site and off-site emergency plans have been drawn up to deal with any major accidents that may occur.

COMAH legislates a large number of the issues associated with incident prevention and management in detail. This report will draw on these in overview and refer to the CoMAH report as necessary.

Summary of Management Controls

The Fife NGL Plant Emergency Procedures (Doc 7501-001) contains comprehensive information about the Mossmorran Emergency Response organisation, arrangements, and procedures that will enable the plant to manage an emergency.

Emergency response team members are trained and tested in executing their allocated role. Training scenarios have been developed for all Major Accident Hazards (MAH) and Major Accidents to the Environment (MATTE) events, as well as other safety and environmental scenarios. These are used to train operations shift teams at their routine training exercises to ensure an effective response should it happen for real. In addition, annual live play emergency exercises are conducted in conjunction with the emergency services. Additional training is periodically conducted to extend and improve the capabilities of the response team. The outcome of the exercises is documented in Sharepoint and actions recorded in Fountain.

Any low-risk hazards are managed through the site maintenance and inspection regime, environmental awareness training and competency of personnel. There are a number of spill kits located around the plants. Any environmental incidents, including near misses, are entered into the Shell Corporate Incident Reporting database, and depending on the incident, are disseminated

for lateral learning. All incidents are discussed within site Leadership Team and high and medium risk incidents by an Incident Review Panel.

This report has been written to provide the Incident Prevention and Mitigation Plan. This plan draws on a number of pre-existing control documents, accident and emergency plans and procedures and assembles them into a cohesive plan. The structure of this report is to outline the incident scenarios and point to the relevant documentation for details on the actions required.

Incident Prevention and Mitigation Plan

As previously discussed, the CoMAH Safety report considers incident prevention and mitigation measures.

Control of Major Accident Hazards (CoMAH) Safety Report

The Control of Major Accident Hazards (CoMAH) regulations require that the plant is designed, constructed, maintained and operated to provide protection to health, safety and the environment. Incident protection and mitigation is described within the Safety Report in detail including how this is achieved. The Safety Report is divided into six parts and follows guidance issued by the Health and Safety Executive (HSE). The parts are summarised below:

- Review cycle of the report
- Operations carried out at the plant and, the local receiving environment which may receive any emissions from the plant
- Safety Management System and how management measures are taken to prevent major accidents (including incidents covered by the Major Accident Prevention Policy (MAPP))
- Processes, likelihood and impact of Scenarios leading to a major accident
- Descriptions of plant design and operation regarding prevention of major accidents
- Emergency response process (including on-site and off-site communication)

Major Accident Prevention Policy (MAPP)

Within the CoMAH report is the Major Accident Prevention Policy (MAPP), which provides further detail on the Corporate Management System procedures and work instructions in place which control how issues of safety and incident prevention and mitigation are dealt with.

The structure of the Safety Management System is such that the approach laid out in the safety report and the MAPP in particular applies to all activities. This ensures that incident mitigation and prevention is a continuing process.

Accident Scenarios

The CoMAH safety report contains the following Major Accident Hazard (MAH) and Major Accident to the Environment (MATTE) scenarios.

The CoMAH safety report deals with these specific incidents in detail. However, all incidents are dealt with, within the Safety Management System. The specific scenarios make reference within the actions required of them to the Emergency Response Manual. This provides details on the roles and responsibilities of those involved in the response to incidents.

Emergency Response Procedures

An emergency is defined as an unexpected event, which presents an actual or potential risk to life, property or the environment and requires fast and effective response to prevent or limit the consequences. Shell maintains a policy that deals with incident mitigation and prevention and from the policy the Shell Fife NGL (FNGL) Emergency Procedures have been produced.

The Shell Emergency Preparedness and Response Policy Statement is quoted below:

'Shell will retain an effective means of managing any emergency event which may occur in its operations. This will be achieved by:

- 1. clearly identifying responsibilities for emergency preparedness and response*
- 2. ensuring that effective plans, organisations, procedures and resources are in place*
- 3. responding effectively to any emergency which occurs, and minimising environmental impact*
- 4. carrying out exercises to test their effectiveness*
- 5. reviewing the totality of arrangement in the light of experience gained from audits, exercises and response to real emergencies*
- 6. implementing identified improvements.'*

The manual fulfilling these policy obligations is the Shell Fife NGL Plant (FNGL) Emergency Procedures. The manual documents:

- Responsibilities for emergency preparedness and response in the event of an emergency at the Shell Fife NGL Plant
- Local emergency plans, organisation, procedures and resources
- Requirements for testing and training of systems, procedures and personnel
- Environmental check lists.
- Lessons learnt from audits, exercises, responses to real emergencies, and improvements identified by Regulatory Agencies (HSE, SEPA, etc.), are incorporated into the manual by the appointed custodian.

All of the arrangements, written in the Emergency Response Manual are reviewed regularly, and are further supported by the External Local Authority Emergency Services, namely Fire, Police, Ambulance and Fife Council Emergency Planning Unit (E.P.U.)

The Emergency Response Plan contains explicit Emergency / Environmental Checklists of actions to take in the event of an incident. These are detailed in Part E and cover the types of incident listed below. These are by their nature expected to be at a lower level than the CoMAH scenarios.

- | | |
|-------------------------------------|------------------------|
| • Gas Leaks/Fires (General) | • Glycol Spill/Fires |
| • Spills (General) | • Methanol Spill/Fires |
| • Environmental Incidents (General) | • Laboratory Fires |
| • NGL and Propane leaks/Fires | • Warehouse Fires |
| • Diesel Spill/Fires | • Bomb Threats |

- Suspect packages
- Intruders
- Informing the media
- Incidents Involving Radioactivity
- Food Poisoning
- Control Room Incident

It is expected that these Emergency procedures are to be followed in the event of any incident and provide instruction on how to mitigate against any damage and prevent escalation of the incident.

At a lower level than the Emergency Response Manual are plant operating procedures (POPMs) which provide further specific instructions and support for plant operations and for incident prevention and mitigation.

Operating Procedures for Incident Prevention And Mitigation

The POPMs provide procedures for a number of plant activities on site and these are set to ensure that operations are carried out correctly and consequently do not lead to incident. Within the POPMs are a number that deal explicitly with incident prevention and mitigation. The two procedures below being arguably the most important, with the first referencing all the other plant procedures.

Review of Procedures, which have the Potential to Impact on the Environment (MGH044) - This procedure resulted from a review to identify all of the other site procedures in operation at the site, which if not adhered to could result in environmental impact. It identifies the critical control points within the procedures and ensures that the risk points are noted with the potential impact. This helps to ensure that compliance with the identified procedures is being maintained.

Local Arrangements for Mitigation of Pollution (MGH033) - This procedure is set up to cover pollution incidents which do not necessarily require implementation of the formal Emergency procedures 7501-001/3/4, though of course they may do so. Such incidents for example may be spillage of oil onto the ground, or mal-operation of the Y trap, where immediate remedial local action is required. The objective is clearly to ensure the site is able to respond to all environmental pollution incidents affecting the ground or watercourses.

This procedure also lists all of the spill kits and their location around the site as well as the actions to be taken.

Spill Protection

Secondary containment measures are in place to minimise the consequence of liquid spills and leaks (e.g. spills of chemicals, lube oils, glycol, diesel etc). These include a secondary tank wall, bunds, sumps, catch trays, concrete hard standing, and a segregated drainage system. Bunds are located around storage tanks and vessels where there is a potential risk of pollution. All bunds on the Plant are:

1. impermeable and resistant to stored materials, are either self-contained.
2. have a capacity greater than 110% of the largest tank (or 25% of the total tankage); and
3. are either totally contained or contain a sump.

All sumps are contained by a closed valve, which is only opened by authorised personnel once the content of the sump has been analysed by the plant's laboratory. Bund/sump water is either uplifted directly by tanker for offsite disposal or released to the drainage system once analysis has been confirmed.

All the main process areas of the plant are located on concrete hardstanding that drains to the plant's drainage system. The plant has a segregated drainage system. Drainage from the areas of hardstanding is routed to the AOC (accidentally oil contaminated) drainage system and 'Y' trap designed to skim off any entrained hydrocarbons before they enter the firewater pond. This system ensures that any spills or fugitive releases in these areas will not enter the soil or groundwater. Temporary bunds and catch trays are used where appropriate, for example for temporarily storing drums on, used during operations that may result in a spill (e.g. the draining of lube oil from equipment into containers during maintenance or during decanting of containers into smaller containers), or placed below small leaks until repairs are carried out.

If spillages occur in areas where there is no hard standing e.g. gravelled area, the contaminated soil/gravel is removed (as waste) and the areas remediated. There are also spill kits located around the plant that contain absorbent materials, temporary bunds, etc., that are used to clean up any spills or leaks to prevent them reaching the drainage system or soil and groundwater. Plant personnel carry out daily watch keeping inspections. These check whether bunds require emptying, that leaks and spills have not occurred on the plant, etc.

Maintenance and Work Controls

One of the major contributing factors to incidents is poor or incorrect maintenance of plant. To ensure that the correct tasks are carried out at the correct time with the appropriate method being used a maintenance task generating system is used in conjunction with a permit to work system which controls how the tasks are carried out. Once the permit has been raised with the job description the jobs are then reviewed and operators briefed with a toolbox talk; this ensures that staff is fully aware of what is required and the precautions that need to be in place to ensure that the assigned job runs smoothly and that there are no incidents.

Shell runs a very comprehensive preventative and operational maintenance programme for all the plant. This is the SAP system, which generates work jobs and tasks and lists all of the requirements for all identified equipment. Once the task has been identified and generated in SAP the permit for the work to take place is generated and the detailed work planning is carried out.

The work planning includes details of procedures that are relevant, instructions on how the job should be scheduled and carried out, including all isolations necessary, scaffolding and risk assessments from both a health and safety and environmental perspective.

Once the work pack has been generated it is passed to the appropriate operators to carry out. The job will be briefed out to all of those involved in the job with the potential risk points clarified and the actions required to mitigate against the risk explained.

This process of work control is the fundamental of the incident prevention and mitigation plan.

DECOMMISSIONING PLANS

Introduction

Condition 2.9.1 requires that a decommissioning plan is prepared and maintained, which describes the steps to be taken after the cessation of activities. The permit also requires that this is reviewed and updated every four years or when substantial changes to the extent or nature of the installation are planned.

As de-commissioning is not envisaged within the short to medium term, detailed plans are not considered appropriate at present. The De-commissioning Plan will be developed in accordance with the Shell Guidelines and will be worked up in sufficient detail to be able to be followed to provide a fully controlled project.

In accordance with condition 2.9.2 of the permit SEPA will be informed no later than two months prior to the proposed date of cessation of activity.

Regulations and Internal Guidance

Shell recognises that over the coming years, a number of the production and processing facilities within the Company's business units will reach the end of their productive use. Shell Control Framework and standards intend to give an overview of the decommissioning process and provide a starting point in tandem with the local Regulatory Requirements around which a more detailed management plan can be structured.

The site Decommissioning Plan shall contain references to the specific legislation and associated requirements relevant to the demolition and decommissioning process and the internal guidance produced by Shell to inform and steer the process.

The primary control philosophy stated within Shell for the decommissioning is that of Best Practical Environmental Option (BPEO). This is considered to be analogous to BAT in this context. The BPEO main considerations are:

- Health/Safety
- Environmental
- Cost/Commercial
- Technical
- Public Acceptability
- Schedule
- Company Reputation.

A thorough review of the existing land lease agreement will dictate the requirements for addressing site reclamation, rehabilitation, and regeneration of each production site. Changes to the original land lease agreement will be addressed in an action plan to manage the process.

Overall Programme

Along with preparing a scope of work, identification of risks will be completed that address equipment lists, reusable equipment and materials, tonnes of demolition debris, pipelines, utilities and cables. A removal and disposal methodology will be included for each identified work task.

To meet proposed project schedules, it is important to recognise that processing environmental/demolition permits will be difficult and require long lead times to seek mutual agreement among all parties.

Close-Out Documentation

A close-out report will list all actions that have been carried out during the decommission project, including;

- Details of all relevant persons involved.
- Details of structure.
- Details of deliveries to the disposal facility.
- Details of all disposals.
- Copies of disposal records.
- Details of all relevant permissions and licences.

Completion of these documents will enable the company to identify what has been carried out during the decommissioning project.

Licences and Permissions

In addition to the above listed demolition regulations, specific approvals are needed for certain demolition activities. These include explosive demolitions and removal and disposal of asbestos. Waste disposal of those substances to be encountered during demolition activities will require detailed manifests. Securing licences and written permission for certain demolition activities will be required to perform the work.

Decommissioning in Accordance with the PPC Regulations

The Mossmorran installation was designed and built to operate until 2004, but, due to the new incoming Norwegian NGL gas stream production, the plant is forecast to operate for the next fifteen years, until 2024, or longer depending on available gas stream production.

Shell has addressed pollution preventive measures beginning with the plant construction in the 1980's, to plant commissioning in 1984. This environmental awareness and pollution prevention program will facilitate effective and safe decommissioning of the site.

The decommissioning process will include several documents requiring review by the Decommissioning Team. Typical documents included in the PPC permit process will be a Site Closure Plan, Site Protection and Monitoring Plan, Decommissioning Plan, and a Site Surrender Report.

This 'Site Closure Plan' will outline the measures to avoid any pollution risks in order to return the site to a satisfactory state. An environmental impact report will identify impacted site conditions with recommended solutions and costs to remediate the affected areas.

Finally, Shell will prepare a comprehensive decommissioning plan to assess the technical, cost, health and environmental aspects to meet all regulatory compliance to finalise the plant decommissioning.

The Site Closure Plan will describe the proposed measures that the company will undertake during the decommissioning of the Mossmorran Plant. The application will describe actions taken to avoid environmental damage due to pollution risks. This process will return the site to satisfactory conditions in order to meet permit obligations.