



SHELDUCK SOUTH PAD FLUID LEAK DETECTION PLAN

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Article I. Introduction

Location Information

This document provides site-specific information for the Shelduck South Pad within the Shelduck South OGD. The information in this document relates specifically to the time during the construction, drilling, completion, and production of the eight (8) proposed horizontal wells on this location. This project is a refile of the approved Location ID 455769.

The proposed location is rangeland approximately 4,000 feet south of Weld County Road 97, south of Highway 14. The Pad will be in Lot 6, Section 6, Township 7 North, Range 60 West, zoned Agricultural within the Ag-Rural Planning Area of Weld County. A WOGLA application for the Shelduck South Pad was approved as WOGLA20-0059 on August 27, 2020.

The proposed Pad will be 11.0 acres, reduced to 5.6 after interim reclamation. The Pad is on Parcel 071906000001 owned by Edith L West, Donald James West, Neil Stewart West, Terrance O Bolton, and Alice M Jones. The location is currently used for farming.

The proposed production facility equipment for the Shelduck South Pad will be located within the Working Pad Surface adjacent to the wells and will consist of oil tanks, water tanks, separators, vapor recovery towers (VRT), vapor recovery units (VRU), VOC Combustors, gas compressors, combustors, meter skid(s), Instrument Air skid(s), gas lift(s), sump(s), LACT Unit(s), Pigging Stations, a temporary MLVT, and proposed electrical and/or solar equipment.

Phase	Duration (days)	Estimated Start Date
Pad Construction	20	2 nd Quarter (April) 2022
Facility Construction	60	2 nd Quarter (April) 2022
Drilling	52	3 rd Quarter (July) 2022
Completion	56	4 th Quarter (October) 2022
Flowback	10	4 th Quarter (December) 2022
Production	9125 (25 Years)	1 st Quarter (January) 2023
Interim Reclamation	20	2 nd Quarter (April) 2023*

**or the first favorable growing season.*

Article II. Drilling and Completion Fluids Procedures and Schedules

Monitoring

- A closed-loop system will be used for drilling operations as required by Rule 408.a.
- Equipment and transfer lines will be monitored daily during well drilling and completion for signs of drips, leaks, or spills, which will be corrected promptly.

Inspection

- Similar to production, AVO inspections include a comprehensive evaluation of all pre-production equipment located on-site (tanks, engines, piping, etc.). In addition to frequent AVOs, the locations are manned and monitored on-site 24/7, and additional comprehensive inspections are conducted for drilling and



completions/workovers. During drilling activities, a pre-spud inspection is completed before moving to a new well.

- During drilling operations, regular Auditory, Visual, and Olfactory Monitoring (AVO) inspections are performed on equipment containing hydrocarbons, fluids, or associated chemicals. AVO inspections include taking the time to look, smell and listen for leaks. The fluid management system used during drilling operations is monitored from the rig floor (“dog-house”) for changes in pressure, volume, or rate which are used as indicators for leak detection. In the event abrupt changes in operating conditions are identified on surface equipment used to manage fluids, the rig including transfer lines and storage tanks are inspected by personnel onsite. Operator utilizes an impermeable polyethylene liner beneath the drilling rig during drilling operations. The use of this liner prevents hydrocarbons and other fluids from reaching the soil in the unlikely event a leak does occur. The liner is inspected for integrity throughout drilling operations and maintenance/repair to the liner occurs as needed.
- During completion operations, regular AVO inspections are performed on all lines, tanks, totes, or other vessels containing hydrocarbon, fluids, or fluid additives as well as any lines through which hydrocarbons or other fluids pass through. The fluid transfer system used during completion operations is monitored from the on-site mobile command center for changes in pressure, volume, or rate which are used as indicators for leak detection. In the event abrupt changes in operating conditions are identified on equipment used to in fluid transfer, completions personnel is deployed to inspect the system including pumps, transfer lines and storage tanks. Operator utilizes an impermeable polyethylene liner beneath the drilling rig during drilling operations. The use of this liner prevents hydrocarbons and other fluids from reaching the soil in the unlikely event a leak does occur. The liner is inspected for integrity throughout drilling operations and maintenance/repair to the liner occurs as needed.

Testing

- Prior to initial use, all flowlines are pressure tested using a high-pressure pump and water. All flowlines are then tested annually or if a leak or defect is suspected. A corrosion inhibitor will be run on all steel flowlines. Within the production facility, all flowlines will be installed above ground on a rack, allowing daily visual inspections. Any drain line that is buried will be constructed using poly pipe.

Maintenance

- Operator utilizes additional engineering controls, which may include selection of appropriate materials, use of corrosion inhibitors, use of protective coatings, and cathodic protection techniques to minimize the potential for fluid leaks.

Article III. Produced Fluids Procedures and Schedules

Monitoring

- Description of Lease Operator Inspections, Monthly Documented Inspections & Environmental Inspections: Audible, Visual, and Olfactory (AVO) inspections of the facility are conducted daily by the Operator. Any valve or fitting that is found to be leaking is either repaired immediately or well shut-in procedures are implemented.



- Fluid Monitoring in tanks will be achieved through high level alarms installed in each tank with floating tank level gauges. These gauges report remotely tank volumes via SCADA. The SCADA system is designed with alarms that are triggered by irregularities can activate automatic shut-in of the well and facility.
- The location will utilize a SCADA (remote monitoring) system to monitor facility pressures and flows. Sensors are placed on multiple points throughout the facility and are designed to measure the system for irregularities that would indicate a leak in the system or change in production of oil, water, or gas. The SCADA system is designed with alarms that are triggered by irregularities and will activate automatic shut-in of the well and facility.
- During completion operations, regular AVO inspections are performed on all lines, tanks, totes, or other vessels containing hydrocarbon, fluids, or fluid additives as well as any lines through which hydrocarbons or other fluids pass through. The fluid transfer system used during completion operations is monitored from the on-site mobile command center for changes in pressure, volume, or rate which are used as indicators for leak detection. In the event abrupt changes in operating conditions are identified on equipment used to in fluid transfer, completions personnel is deployed to inspect the system including pumps, transfer lines and storage tanks. Operator utilizes an impermeable polyethylene liner beneath the drilling rig during drilling operations. The use of this liner prevents hydrocarbons and other fluids from reaching the soil in the unlikely event a leak does occur. The liner is inspected for integrity throughout drilling operations and maintenance/repair to the liner occurs as needed.

Inspection

- Integrity testing of flowlines connecting wellheads to the separators: All flowlines are designed, constructed, and tested to ASME B31.4 and API 1104 standards. Only materials with Material Test Reports (MTRs) provided by the pipeline supplier are used in the construction of the flowlines.
- Pressure testing of the flowlines is conducted on an annual basis.
- All equipment, including:
 - wellheads
 - separators
 - tanks
 - heaters
 - Pumps - improper seals
 - General-purpose valves
 - Flanges and fittings
 - Sampling connections
 - Compressors - seal failure
 - Pressure relief valves
 - Open pipe connections

Are inspected for:

- failure of packing or O-Rings
- gasket failure or loose bolts
- seal failure
- odors
- sound/vibration
- visual evidence of rust or stains
- Audible, Visual, and Olfactory (AVO) inspections are of the facility are conducted daily by the Operator. Any valve or fitting that is found to be ineffective is either repaired immediately or well shut-in procedures are implemented.



- Documented Audible, Visual, and Olfactory (AVO) inspections and optical gas imaging surveys are conducted monthly by a third-party specialist.
- Tanks and tank berms will be formally inspected quarterly under the Spill Prevention Control and Countermeasures (SPCC) plan unless specific COAs warrant more frequent inspections. Additionally, all Tanks are inspected daily as part of Mallard's Audible, Visual, and Olfactory (AVO) inspections.

Testing

- Integrity testing of flowlines connecting wellheads to the separators: All flowlines are designed, constructed, and tested to ASME B31.4 and API 1104 standards. Only materials with Material Test Reports (MTRs) provided by the pipeline supplier are used in the construction of the flowlines.
- Pressure testing of the flowlines is conducted on an annual basis.

Maintenance

- If a leak is discovered or suspected, the well will be shut in and the line will be hydrotested. If a leak is determined, the well remains shut in while the leak is located and repaired. Not until the line has passed hydrotesting, will the well be brought back online.

Article IV. Record Keeping

Spill response includes notifications, reporting, response actions, remediation, and corrective actions. Waste will be properly classified as E&P or non-E&P wastes. For E&P waste, all spills greater than 1 barrel (outside containment) or greater than 5 barrels (inside containment) will be reported to the COGCC using a Form 19. Should remediation be required, Form 27 will also be submitted. Spills related to non-E&P waste will be managed in accordance with CDPHE and EPA regulations depending on the volume spilled. Mallard will maintain and keep all records, reports, and underlying data required by COGCC Rules for a period of five years. Mallard will also maintain and keep chemical inventories and well records, as required, for five years after plugging and abandoning the applicable well or closure of an oil and gas location. Copies are available upon request.

Article V. Site-Specific BMP

- Spill prevention and response are addressed in training of employees and contractor personnel on at least an annual basis.
- The surface of the location will be plated with 6 inches of road base aggregate compacted to 4 inches that will deter releases from easily seeping into the soil. Operator will install an earthen berm and ditch system around the perimeter of location that would keep a release from moving out onto un-plated soil.
- Operator utilizes additional engineering controls, which may include selection of appropriate materials, use of corrosion inhibitors, use of protective coatings, and cathodic protection techniques to minimize the potential for fluid leaks.
- No pits will be used on location, therefore pit level Indicators will not be used on location.
- Operator will install an engineered containment system around the tank battery. The containment system is constructed of a perimeter of metal walls that are post driven into the ground around a flexible geotextile



base. All components are then sprayed with a polyurea liner technology. This liner technology maintains impermeability and is puncture resistance under exposure to UV rays, weather extremes, and chemicals commonly encountered in oil and natural gas production and provides seamless protection. The liner is then topped with pea gravel. Secondary containment will be installed around separators and treaters consisting of metal berm walls. The separators and treaters will be set on top of compacted road base.

- Berms or other secondary containment devices shall be constructed around crude oil, condensate, and produced water storage tanks and shall enclose an area sufficient to contain and provide secondary containment for one-hundred fifty percent (150%) of the largest single tank. Berms or other secondary containment devices shall be sufficiently impervious to contain any spilled or released material. All berms and containment devices shall be inspected at regular intervals and maintained in good condition.
- Tertiary containment, such as an earthen berm, will be installed as required for Production Facilities within 500 feet of a down gradient surface water feature. All berms will be visually checked periodically to ensure proper working condition. The Shelduck South Pad is not within 500' of a downgradient surface water feature.
- During drilling and completions operations a temporary impermeable synthetic or geosynthetic liner will be utilized under equipment. This liner will be installed on top of the plated surface and will provide an additional layer of protection against spills. Secondary containment devices, such as duck ponds or equivalent type products, will be used to protect any pipe connections or equipment that carry, mix, or could possibly leak fluids or chemicals.
- All loadlines shall be bullplugged or capped.
- A detention pond will be constructed to capture any sediment prior to leaving the location. The detention pond has been sized in accordance with good engineering practices. A temporary diversion, consisting of a cut swale and compacted earthen berm, will be constructed along the pad edge and routed to the detention pond to prevent offsite migration of sediment/contaminant into the nearby surface water features. If necessary, check dams will be constructed within the swale.
- Location will be equipped with remote monitoring capability including tank level alarms.
- Transfer Lines – Fueling the drill rig will use a rubber hose that is threaded at the fuel tank and delivered to the rig using a spill-proof diesel nozzle.

Article VI. Exhibits/References/Appendices

None