

Fluid Leak Detection Plan

Red Rocks 1-14 Red Rocks 1-16

This Fluid Leak Detection Plan has been prepared by Desert Eagle Operating, LLC (DEO) for its Red Rocks 1-14 and 1-16 helium gas well locations in Las Animas County, Colorado. The Plan addresses the Colorado Oil & Gas Conservation Commission (COGCC) requirement at Rule 304.c.(13) to prepare a Fluid Leak Detection Plan and the fluid leak detection requirements in Rules 608-609 and 1102-1104.

1.0 Introduction and Site Description

DEO proposes to develop helium gas using single conventional vertical helium gas wells. The wells will be drilled with air using a water well-sized drill rig. There will be no drilling mud, hydraulic fracturing, stimulation, or flowback. The wells are not expected to produce hydrocarbons or water, based on results from wells already drilled in this area. Each well will be approximately 1,800 feet deep. The wells will be in the locations listed below. Site elevations are listed in Table 1.

Red Rocks 1-14: NE ¼ NW ¼ Section 1, Township 30 South, Range 55 West

Red Rocks 1-16: NE ¼ NE ¼, Section 1, Township 30 South, Range 55 West

Table 1. Site Elevations

Location	Elevation (feet)
Red Rocks 1-14	5498
Red Rocks 1-16	5493

Each well will be on fee surface for production of fee minerals. The surface is ranchland. It is leased from a private landowner. Each Oil and Gas Location will be approximately 1.10 acres during well development with a Working Pad Surface of 1.00 acres. After Interim Reclamation, each production pad will be downsized to an estimated 0.20 acres. An estimated 0.90 acres will be reclaimed.

Each well will be developed using air drilling and a compressor. Freshwater will be used for dust suppression with a mist system. An estimated 1 day will be needed to prepare the Working Pad Surface for well drilling, with minimal disturbance because the drill rig is self-leveling. An estimated 7 to 10 days will be needed for well drilling and completion. An estimated 1 day is needed for interim reclamation. Well production is an estimated 10 years. Estimated durations for each phase of development are listed in Table 2.

Table 2. Phases of Development

Phase	Estimated Duration (days)
Construction	1
Drilling	7
Completion	3
Interim Reclamation	1
Production	10 (years)

If the exploratory wells are developed for production, helium gas will be piped underground from the wellhead to a helium processing unit. The off-location flowline will be 8-inch polyethylene. The helium processing unit will be

located on private property. At the helium processing unit, helium gas will be processed, compressed, and loaded onto a tube trailer for transport.

2.0 Drilling and Completions Fluid Leak Detection Measures

Drilling Operations

Wells will be drilled with air using a truck-mounted drill rig, air drilling equipment, and a compressor. The size of the drill rig is comparable to a water well-sized drill rig. The drill rig is self-leveling. A synthetic liner will be placed under the drill rig to capture incidental leaks or drips.

Previous wells drilled in this area have not evidenced produced water from the formation. No produced water or tank storage is anticipated during well development.

Approximately 100 bbl (4200 gallons) of freshwater will be used per well during drilling for dust suppression with a mist system. Freshwater will be stored in a water truck with a 100-bbl water tank. Water will be transferred to the mist pump on the drill rig using a 4-inch flex hose.

A 300-gallon fuel tank will be transported to the location during well drilling. It will be double walled to act as steel secondary containment. Fueling the drill rig will use a 2-inch rubber hose threaded at the fuel tank and delivered to the drill rig using a spill-proof diesel nozzle. The pump on the fuel tank contains a meter to monitor the gallons removed.

A pre-drilling inspection of the equipment will be conducted by the rig and third-party operators trained in integrity management of the system. Inspection will include visual, function, and pressure testing of valves, hoses, and transfer lines to ensure that connections are secure. The system and fluid containers will be inspected daily during use for signs of drips, leaks, or spills.

Completion

Cement will be circulated to the surface for all casing runs. Cement is prepared on site using pallets of bulk bagged cement, freshwater, and a pump truck. An estimated 25 bbl of cement is needed per well. The pumper stops the cement in the casing when it nears the surface to avoid generating excess or waste.

The completions operator will monitor pressure and containment for potential leaks. Visual inspections will be conducted throughout operations to look for signs of leakage. A shutoff valve with an emergency shut down system will be in place. Table 3 lists specific monitoring, inspection, testing, and maintenance procedures.

Table 3. Monitoring, Inspection, Testing, Maintenance Procedures and Schedule

Equipment	Monitoring, Inspection, Testing, Maintenance Procedures	Schedule
Drill Rig and Generator	Operators will visually monitor, as well as function and pressure test, the drill rig. They will look for signs of overheating, drips, and leaks onto the ground. They will inspect the connection points for fuel and water. Any deficiencies will be corrected promptly. A spill or leak will be treated with the spill response material maintained on site and disposed of appropriately as oily waste at a disposal facility authorized to accept the waste.	Continuous while operating
Fuel Tank	The fuel tank will have double-walled steel secondary containment. It will be monitored for signs of drips, leaks, or soil staining. Valves will be kept tightened to avoid leakage. The fuel meter will be monitored for	Daily

Equipment	Monitoring, Inspection, Testing, Maintenance Procedures	Schedule
	evidence of excessive fuel use that could indicate a leak.	
Water Truck	The water truck will have a 100-bbl water tank. The tank will be monitored for evidence of a leak of freshwater that could leave the site or result in a larger spill.	Daily
Transfer Lines	Transfer lines and valves on equipment to support drilling and completion will be monitored visually at the connection points for stains, drips, or other signs of leakage requiring correction.	Continuous while operating

3.0 Produced Fluids and Leak Detection Measures

Production

The well will produce up the casing from open hole below the last casing run. No production tubing is anticipated. A Larkin-type wellhead will be installed at the surface. The wellhead will attach to a meter run. Shut off valves placed before and after the pressure gauge will be used to shut the well in.

The 8-inch polyethylene production flowline will be polywelded above ground to a steel fitting at the meter run. The flowline will be buried. It will transport helium gas to off-location helium processing equipment located on private property, where helium gas will be processed, compressed, and loaded onto a tube trailer for transport.

Table 4. Monitoring, Inspection, Testing, Maintenance Procedures and Schedule

Equipment	Monitoring, Inspection, Testing, Maintenance Procedures	Schedule
Intra-facility Transfer Lines	Transfer lines will be monitored visually at the connection points for signs of leakage requiring correction and will be repaired promptly.	Weekly
Isolation Valves	The operator will maintain isolation valves by performing function tests or maintaining the valve in accordance with its manufacturer's specifications per Rule 1103.a.	Annual
Production Flowline	The 8-inch buried off-location flowline will contain the helium gas stream. The flowline will be installed per Rule 1102. Before the flowline is buried, it will be pressure tested to maximum operating pressure, according to manufacturer specifications. The operator will verify the integrity of the flowline by performing a monthly audio, visual, olfactory (AVO) survey of the line and annual static-head test, in accordance with Rule 1104.	Pre-start up Monthly Annual

4.0 Reporting and Recordkeeping

Inspections and testing will be documented. Documentation will list the activity, date, time, finding, personnel, and signature. Associated testing results will be included. Written records and a copy of this plan will be maintained in the operator's Dallas, Texas office for a period of 5 years. The Fluid Leak Detection Plan will be provided to the site operator.

The potential for a spill response will address rule requirements for notification, reporting, response actions, corrective action, and remediation. Waste will be properly classified as exploration and production (E&P) or non-E&P waste. A spill will be reported to COGCC in accordance with Rule 912.b and using a Form 19. If remediation is required, a Form 27 will also be submitted.

5.0 Site-specific Best Management Practices

Table 5. Best Management Practices

Best Management Practices
<ul style="list-style-type: none"> Site personnel will be trained in spill prevention, response, and response equipment on at least an annual basis. Training will include how spills or releases will be investigated, controlled, and contained in accordance with Rule 912.a.
<ul style="list-style-type: none"> Spills or releases will be investigated, controlled, or contained, in accordance with Rule 912.a.
<ul style="list-style-type: none"> If a spill or release meets criteria in Rule 912.b, it will be reported as specified in the rule.
<ul style="list-style-type: none"> If a catastrophic loss of freshwater occurs from the freshwater truck, soil on site will be used to berm and prevent downgradient runoff.
<ul style="list-style-type: none"> Equipment and transfer lines will be monitored daily during well drilling and completion for signs of drips, leaks, or spills, which will be promptly corrected.
<ul style="list-style-type: none"> Flowlines will be installed consistent with Rule 1102. In accordance with Rule 1104, before a flowline is put into service, it will be pressure tested to maximum pressure for AVO leak detection.
<ul style="list-style-type: none"> The operator will maintain shutoff valves on helium gas flowlines in accordance with Rule 1103.a.
<ul style="list-style-type: none"> Per Rule 1104, the operator will conduct a monthly AVO survey to detect failures or signs of leaks from the wellhead and flowline.
<ul style="list-style-type: none"> The operator will conduct annual flowline integrity testing in accordance with Rule 1104.
<ul style="list-style-type: none"> Site personnel will be instructed on procedures for documenting and recordkeeping inspections and testing.