Marathon Oil Company
DJ Basin

Waste Management and Mitigation Measures

Drilling and Completion Operations Waste

Wells will be drilled with a water-based mud system and all drilling waste (cuttings) will be stored in temporary aboveground containments and excess drilling mud will be temporarily stored onsite in steel tanks and reused at other drilling locations where applicable. Marathon does not utilize hazardous materials in the mud system during drilling operations, nor are petroleum hydrocarbons added. These benign mud systems facilitate the processing of drilling wastes at offsite disposal facilities.

To protect the land surrounding the well location and avoid potential releases from the project, Marathon intends to take the following four precautions:

1. A dual liner will be placed under the entire operational footprint for the drilling rig, diesel storage tank, and mud system. The dual liner system is comprised of a 30-mil thick synthetic impermeable black liner that is in turn underlain by a felt liner which acts to cushion the surface liner and prevent punctures.
2. Use a double-walled diesel storage tank that has an annulus capable of containing 110% of the volume of the inner tank.
3. Store adequate spill response equipment on site to handle accidental leaks or releases of oil, gas, or other toxic materials. The location utilizes a 1.5 foot berm that surrounds the entire pad. The total capacity of the bermed area greatly exceeds the equivalent volume of 110% of the volume of the diesel tank, plus freeboard.
4. Position the rig in a manner to maintain a 100 foot separation between the fuel tank and the inside edge of the perimeter berm around the pad.

In addition to the above precautions, Marathon can utilize the well cellar for containment of fluids that might be released while operations are underway. The fluids would be recovered using vacuum trucks and managed accordingly.

- Drill Cuttings

Marathon plans to temporarily store drilling waste (cuttings) generated while operations are underway. There will be no onsite disposal or discharge of waste generated by drilling. Drilling waste will be collected and stored in temporary aboveground containments that are located adjacent to the mud system units.

The drilling cuttings will be removed and transported by truck to the North Weld Waste Management Landfill. Any excess fluids will be removed and transported via vacuum truck to an approved water disposal well operated by High Plains Disposal in Kersey, Colorado or to the CSI Waste Management Landfill.

- Hydraulic Fracturing Flowback/Workover Fluids

During the completions process, after fracing and prior to production, frac flowback will produce a water/oil mix solution that is directed to a temporary separator which sends water to flowback tanks onsite and any oil to the production storage tanks. The water in the flowback tanks will be sent to a Marathon approved disposal well.

- Miscellaneous Oily Wastes

Oily wastes (oily rags, oily gloves, contaminated soil, etc.) generated by drilling and completion activities are placed in designated receptacles on-site prior to a waste service vendor transporting the wastes to a local landfill approved for these type of wastes.

- Non-hazardous Wastes

Non-hazardous wastes generated during drilling and completions are removed by a contractor and disposed in the North Weld Waste Management Landfill. Covered dumpsters are utilized during operations to prevent wildlife access and to minimize the chance for winds to carry debris off of the pad.

- Temporary Water Use and Wastewater Management

Water for well drilling will come from private water service vendors (A&W Water Services Inc.). Water will be used for drilling and completion operations and facility maintenance. Well completion operations for the well include fracture stimulation using water as a medium.

Water is used for sanitary purposes with the break trailer and temporary quarters under this approval and is tested prior to use once the rig water system has been connected to the supply. Bottled drinking water is provided at several locations around the rig for personnel.

Crews do not stay overnight and commute daily to the location for each shift, eliminating the need for housing and catering. A portable break trailer is provided for the crews that has kitchen facilities, changing areas, and restrooms. Holding tanks have been installed on the underside of the units for wastewater collection. The drilling foremen, HES advisor, and tool pusher stay onsite in temporary quarters that also have attached holding tanks.

Wastewater that is generated is collected in the holding tank and routinely removed by a private company for disposal at an approved facility in Greeley, Colorado.

Production Operations Waste

Compared to the Drilling and Completions Operations there are fewer types of waste generated during the production phase. The following are procedures put into place to deal with the predictable wastes expected to be generated during production.

- Produced Water

Produced water will be stored onsite in 400 bbl storage tanks following separation from the oil. These tanks are located in a metal containment which is certified compliant to our SPCC program standards. The produced water will be loaded out through submerged loading and transported by truck to a Marathon approved water disposal well.

- Tank Bottoms

Marathon utilizes a recycle pump at each location. The pump will be utilized, when necessary, to pull the tank bottoms from the tank through piping and recycle the product back through the separation and production system to ensure ultimate product recovery. Marathon does not anticipate waste generation from this process.

- Miscellaneous Oily Wastes

Oily wastes (oily rags, oily gloves, contaminated soil, etc.) generated by production activities are placed in designated receptacles on-site prior to a waste service vendor transporting the wastes to a local landfill approved for these type of wastes.

- Non-hazardous Wastes

Non-hazardous wastes generated during production are removed by a contractor and disposed in the North Weld Waste Management Landfill. Covered dumpsters are utilized during operations to prevent wildlife access and to minimize the chance for winds to carry debris off of the pad.

Unanticipated Wastes

With any operation there will be waste generation from processes that are unanticipated. Marathon has approved many, far reaching waste vendors through the corporate vetting process and we have extreme confidence that any unanticipated wastes that are generated can be disposed of in a timely and efficient manner.

Marathon Monthly Waste Tracking Database

Marathon updates and maintains a waste tracking database that includes waste identification, quantity, location generated, and disposal location. This helps keep track of the successful implementation of the waste management program and serves as a tool to identify areas for improvement.