ECMC POLICY

Modular Large Volume Tanks (MLVT)

Document Control

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Background

This policy addresses the storage of Fresh Water and specific Exploration and Production Waste (E&P Waste) (Produced Water and Recycled Produced Water) in Modular Large Volume Tanks (MLVTs) that support Well Stimulation for Geothermal and Oil and Gas Operations. (Recycled Produced Water Alternatives are not addressed in this policy and may also be subject to regulation by other agencies. The Director will evaluate the storage of these fluid types in MLVTs on a case-by-case basis.)

MLVTs are field-erected above-ground tanks, typically consisting of a freestanding steel structure (commonly a modular ring) with a synthetic liner or a bladder to hold fluids. Various models and styles of MLVTs are covered under this policy, including Minion® type tanks and Harpoon® tanks. MLVTs are capable of storing up to 50,000 barrels (bbls) or more of water for Well Stimulation operations and are being used in lieu of historic in-ground pits or multiple mobile 500-bbl steel frac tanks. The use of MLVTs and pipelines to deliver water can significantly reduce the number of truck trips and decrease time required for set up of Stimulation operations.

This policy was originally developed in response to the increasing use of MLVTs to hold large volumes of water typically associated with new Well Stimulation operations. ECMC has evaluated the efficacy of this policy and the performance of MLVTs for

several years and is expanding the policy to address the storage of E&P Waste (Produced Water or Recycled Produced Water) in MLVTs. During the evaluation period, the Director considered requests to store Produced Water and recycled E&P Waste in MLVTs on a case-by-case basis.

Between October 2011 and June 2013, five catastrophic failures of MLVTs that contained Fresh Water occurred in Colorado that were reported to the ECMC. Causes of the failures have been attributed to liner seam failure, improper liner installation, steel weld failure, poor MLVT siting (one MLVT failed and caused an adjacent MLVT to fail), and unsuitable or underprepared substrate. Failures have not been limited to any specific Operator, manufacturer, or MLVT construction type. There have been no documented failures since that time period and after the implementation of the MLVT policy. As MLVT technology continues to advance, this policy may be subject to future changes.

Definitions

Modular Large Volume Tanks (MLVTs) are not defined in the ECMC Rules. For the purpose of this policy, MLVTs include any aboveground tank that is field-assembled from multiple, uniform, factory-prepared components used to support a synthetic liner or bladder which provides primary containment for 5,000 barrels or more of fluids. By this definition, MLVTs are typically field-assembled on an Oil and Gas Location for temporary use and are dismantled for movement to a different location following their use.

Capitalized words and terms in this policy are defined in ECMC Rules* and those definitions apply to this Policy.

> **CENTRALIZED E&P WASTE MANAGEMENT FACILITY** means a facility, other than a commercial disposal facility regulated by CDPHE, that (1) is either used exclusively by one owner or Operator or used by more than one Operator under an operating agreement; and (2) is operated for a period greater than three

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years; and (3) receives for collection, treatment, temporary storage, and/or disposal of Produced Water, drilling fluids, completion fluids, and any other exempt E&P Wastes that are generated from two or more production units or areas or from a set of commonly owned or operated leases. This definition includes oilfield naturally occurring radioactive materials ("NORM") related storage, decontamination, treatment, or disposal. This definition includes permanent, standalone centralized facilities operated for the storage or treatment of Produced Water. This definition excludes a Multi-Well Pit that meets the standards of Rules 909.g.(2)-(3) and excludes temporary onsite Produced Water or storage treatment facilities for recycling or reuse of Produced Water at that Well Site or nearby Well Sites.

ENHANCED SYSTEMS AND PRACTICES (ESPs) means equipment, methods, or other operational techniques that are designed to avoid, minimize, and mitigate emissions of ozone precursors from Oil and Gas Operations.

EXPLORATION AND PRODUCTION WASTE (E&P WASTE) shall mean those wastes associated with operations to locate or remove oil, gas, or Geothermal Resources from the ground or to remove impurities from such substances and which are uniquely associated with, and intrinsic to, oil and gas or geothermal exploration, development, or production operations that are exempt from regulation under Subtitle C of the Resource Conservation and Recovery Act (RCRA), 42 USC Sections 6921, et seq. For natural gas, primary field operations include those production-related activities at or near the wellhead and at the gas plant (regardless of whether or not the gas plant is at or near the wellhead), but prior to transport of the natural gas from the gas plant to market. In addition, uniquely associated wastes derived from the production stream along the gas plant feeder pipelines are considered E&P Wastes, even if a change of custody in the natural gas has occurred between the wellhead and the gas plant. In addition, wastes

uniquely associated with the operations to recover natural gas from underground storage fields are considered to be E&P Waste.

FRESH WATER except as used in Rule 408, "Fresh Water" means water that is not Produced Water or Recycled Produced Water Alternative.

OIL AND GAS FACILITY means equipment or improvements used or installed at an oil and gas location for the exploration, production, withdrawal, treatment, or processing of crude oil, condensate, E&P Waste, or gas.

OIL AND GAS LOCATION shall mean a definable area where an Operator has disturbed or intends to disturb the land surface in order to locate an oil and gas facility.

PRODUCED WATER means water, including the water's mineral and chemical components, in or introduced to a geological formation, that is co-produced with oil or natural gas from an Oil and Gas Well. Produced Water includes Flowback water, excluding Proppants returned to the surface.

PRODUCTION FACILITY means any storage, separation, treating, dehydration, artificial lift, power supply, compression, pumping, metering, monitoring, flowline, and other equipment directly associated with a Well.

RECYCLED PRODUCED WATER means Produced Water that is reconditioned into a reusable form and reused in Oil and Gas Operations, that is reused in Oil and Gas Operations without reconditioning, or an equivalent as determined by the Commission during its review of an Oil and Gas Development Plan.

RECYCLED PRODUCED WATER ALTERNATIVE means brine resulting from reverse osmosis or other treatment that has a concentrated waste stream, waters from geologic formations that have been designated as exempt under Rule 802, waters from geologic formations that have a total dissolved solids ("TDS") concentration greater than 10,000 milligrams per liter, spent water from tank cleaning and

hydrotest operations, and waters that would otherwise be disposed of in Class I or Class II UIC wells.

TANK shall mean a stationary vessel constructed of non-earthen materials (e.g concrete, steel, plastic) that provides structural support and is designed and operated to store produced fluids or E&P waste. Examples include, but are not limited to, condensate tanks, crude oil tanks, produced water tanks, and gun barrels. Exclusions include Containers and process vessels such as separators, heater treaters, free water knockouts, and slug catchers.

ECMC Jurisdiction Over MLVTs

ECMC has jurisdiction over an MLVT when it is being used by an Operator for Geothermal Operations or on an Oil and Gas Location in the conduct of Oil and Gas Operations.

Although MLVTs meet the ECMC 100-Series regulatory definition of an Oil and Gas Facility, they are not explicitly addressed in ECMC's 300-, 600-, or 900-Series Rules.

- MLVTs for Fresh Water storage are considered Oil and Gas Facilities but not Production Facilities.
- MLVTs used to store Produced Water or Recycled Produced Water fit under the definition of Tanks and are considered Oil and Gas Facilities and Production Facilities under this policy.

ECMC does not have jurisdiction over MLVTs operated by commercial entities or private parties for the storage of Fresh Water and not situated on a Geothermal or Oil and Gas Location.

Applicable Rule References

All MLVTs are subject to rules and conditions that include;

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- The applicable Rule 411 standards for tank placement.
- The Rule 605 signage requirements for tank and container labels apply to MLVTs. This includes signs or labels with tank contents (i.e. Fresh Water, Produced Water, Recycled Produced Water), name of Operator, Operator's emergency contact telephone number, and tank capacity.
- Rule 905.c.(6).E. Water Use Consistent with Limitations. Unless an Operator can show that water will be diverted from the stream system only during Free River conditions, when all water rights are satisfied, the Fresh Water used in drilling and completion operations must be used in accordance with any limitations on a water right, permit, or administrative approval for industrial use.
- If areas are to be graded and disturbed, the Operator must conduct such activity in accordance with Rules 1002.b. and 1002.c.
- MLVT placement on the filled portion of a Working Pad Surface constructed on a cut and filled slope should be avoided.

In addition to the requirements in the above sections, MLVTs used for E&P Waste (Produced Water or Recycled Produced Water) storage are subject to rules and conditions that include:

- Rule 437.b., which specifies that the chemical constituents listed in Table 437-1 are only allowed in naturally occurring trace amounts in recycled produced water.
- Rule 437.c., which specifies that chemicals listed in Table 437-1 in recycled or reused produced water will be below the concentration standard in Table 915-1.
- Rule 603.o., which specifies secondary containment requirements, including

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placing MLVTs within lined secondary containment that provides at least 150 percent containment of the largest tank.

- The applicable Rule 608.a. standards, including conformance with the applicable API standards, setback distances, and labeling requirements.
- Storing E&P Waste in an MLVT prior to obtaining an approved Waste Management Plan would constitute a violation of Rule 905.a.
- Rule 908 permitting requirements for Centralized E&P Waste Management Facilities apply to MLVTs that will be in place for three years or more to hold Produced Water, Recycled Produced Water, or other E&P Waste from two or more production units or areas or from a set of leases.
- Rule 1202.a.(3). applies to MLVTs that are staged to store E&P Waste
- Open-top MLVTs for storage of E&P Waste should have Colorado Parks and Wildlife approved bird netting installed and monitored on a daily basis.
- MLVTs in Oil and Gas operations are subject to the application of Enhanced Systems and Practices (ESPs) for the avoidance, minimization, and mitigation of emissions.
- The Director will evaluate permit applications that propose MLVTs for storage of E&P Waste in defined Floodplains on a case-by-case basis.

Notice to ECMC

Operators must notify the ECMC and obtain Director or Commission approval prior to placing an MLVT into service at an Oil and Gas Location or Geothermal Location as follows:

1. For use on a new Oil and Gas Location (as defined in Rule 304.a.) or a new Geothermal Location, an Operator must indicate such use on the Form 2A,

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Oil and Gas Location Assessment or the Form 2G Location Assessment.

2. For use on an existing Location with an approved Form 2A or Form 2G, an Operator may submit a Form 4, Sundry Notice, indicating its intent to use an MLVT and requesting a modification of the listed Oil and Gas Facilities or Geothermal Facilities. However, consistent with Rule 304.a., an amended Form 2A that is part of an Oil and Gas Development Plan (OGDP) is required if the addition of an MLVT results in a significant change or expansion of an existing Oil and Gas Location or Working Pad Surface.

3. Operator must provide information on the Form 2A, Form 2G or Form 4 for a proposed MLVT that includes:

    - Manufacturer or vendor of the MLV;,
    - Number and size(s) of the MLVTs;
    - Anticipated timeframe MLVTs will be onsite;
    - A Layout Drawing indicating where the MLVTs will be located with respect to other facility equipment and property boundaries; and
    - A Best Management Practice (BMP) with the Operator's certification that the MLVTs utilized on the pad will be designed and implemented consistent with this ECMC Policy on the Use of Modular Large Volume Tanks.

The Director will consider the Operator's plan for the proposed MLVT and if the Operator has provided the necessary and reasonable measures to sufficiently avoid, minimize, and mitigate the potential impacts. Based on this review, the Director will determine if administrative approval of the Form 4 Sundry is appropriate. For an MLVT proposed as part of a Form 2A, the Director will address any unresolved concerns about the MLVT in the Director's Recommendation.

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Design Criteria

Operators are not required to submit the MLVT design package to the ECMC with their Form 2A, Form 2G, or Form 4, but they must make the records available to the ECMC upon request.

The MLVT design package must be certified and sealed by a Licensed Professional Engineer stating that the design specifications are adequate to withstand the loads resulting from using the tank. The Licensed Professional Engineer must either be licensed in Colorado or the state where the MLVT was designed or manufactured. The design package must include the following components:

1. Detailed tank design;
2. Specific tank installation and assembly procedures;
3. Applicable API standards - documentation of appropriate site conditions for installation, which includes grades, bedding material, and potential weather impact;
4. Appropriate site preparation including grading and compaction;
5. The required liner material and minimum thickness for the application, along with applicable standards;
6. Liner installation procedures and quality control measures;
7. Periodic testing or reinspection requirements including what to perform, when to perform, and testing guidelines/protocols; and
8. Detailed Standard Operating Procedures (SOP) for all of the above items.

Operators may obtain individually certified and sealed design package components instead of a fully certified design package as listed above.

Site Preparation & Installation

MLVT placement should be based on location configuration, nearby surface waters, site visibility, surrounding land use, property lines, onsite traffic, site security, topography, nearby building units, roads, access points, and surface owner and agency requests.

The Operator is responsible for maintaining records from the contractor who installed the MLVT of verification that the site was prepared and the MLVT was installed in accordance with the above design package specifications and associated SOPs, and that the MLVT is being used for its intended purpose.

Site preparation, pad construction, and assembly requirements for MLVTs include:

- Proper grading and ground compaction based on geotechnical parameters, typically meeting or exceeding a 95 percent compaction rating;
- Pad must be level, debris free, and clear of sharp objects;
- Use of clean compactable material such as clay, road base, crusher fines, clean spoil material, and/or other suitable materials.
- MLVTs assembly and operation in accordance with a design package certified and sealed by a licensed Professional Engineer either in Colorado or the state where the MLVT was designed or manufactured.
- Construction and installation of the tank structures and liners meet or exceed the manufacturer's specifications. Operator shall follow the manufacturer's Standard Operating Procedures (SOPs) and shall provide these SOPs to the ECMC upon request.
- All liner seams (MLVTs and pad) shall be welded and tested in accordance with applicable ASTM international standards. Any repairs to liners shall be made using acceptable and applicable practices and standards.

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MLVT Operations

The oil and gas Operator must be present during the initial filling of a MLVT, but the contractor who installed the MLVT, with stop work authority, must supervise and inspect the MLVT for leaks during filling. If leaks are observed, filling must cease, the leaks must be repaired, and the integrity of the tank must be evaluated prior to continuing to fill or otherwise use the MLVT. Contractors can observe all future fillings without an Operator present, provided they are granted the authority to stop work if unsafe or upset conditions are observed.

MLVTs will be operated with a minimum of 1 foot freeboard or the manufacturer minimum requirement.

Access to the tanks must be limited to operational personnel and authorized regulatory agency personnel.

Operators employing MLVTs on their Oil and Gas and Geothermal Locations must comply with the testing and reinspection requirements and associated written standard operating procedure (SOP) listed in the design package above. Records of these inspections and action items must be maintained for a period of at least 5 years (per Rule 206) and provided to the ECMC upon request.

Operators must conduct daily visual inspections of the exterior wall and general area for any integrity deficiencies before, during, and after filling the MLVTs. Operators should use construction sign-off, site preparation sign-off, completion sign-off, pre-fill, and site visit checklists to maintain a record of inspections. If deficiencies are noted, they must be repaired as soon as practicable. Records of repairs made must be maintained and provided to the ECMC upon request.

Contingency Planning and Emergency Response Plan (ERP)

Each Operator must develop a contingency plan/emergency response plan (ERP) for any MLVT leak or catastrophic failure of the tank integrity and resulting loss of fluid.

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The contingency plan must be made available to the ECMC upon request and should describe procedures for notifying all required regulatory agencies and local emergency authority (municipality, county, or both). This includes:

- filing a Form 22-Accident Report in accordance with the notification requirements in Rule 602.h.,
- conducting a "root cause analysis",
- providing it to the ECMC on a Form 4 Sundry Notice,
- submitting a Form 19 Spill/Release Report if the loss of fluids meet the reporting requirements established in Rule 912.b.(1)., and
- employing Best Management Practices (BMPs) to prevent injuries, property damage, or environmental impacts, such as erosion of onsite sediment into nearby surface water.

A 24-hour remote monitoring alarm system is required for MLVTs used to store E&P Waste. The system should be set up to immediately detect any aberration within the MLVTs and transfer piping equipment. This system will allow for immediate response to mitigate any potential leaks that may occur. The following actions are suggested if a leak is detected in a MLVT:

- Pump water from the problem tank(s) to other tanks on location,
- Reverse flow on the water transfer line and pump water from the problem tank(s) to a facility for disposal, and
- Utilize water trucks, as needed, to assist in the transport of the water from the problem tank to a facility for disposal.

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Best Management Practices (BMPs)

An Operator proposing to locate an MLVT within 2,000 feet of a Building Unit must include site-specific BMPs on the Form 2A, Form 2G, and Form 4 that address mitigation of noise, lights, odor, and dust associated with the use of the MLVTs. Additionally, if an MLVT is proposed to be located immediately up gradient of a Building, the Operator must include BMPs to eliminate or minimize potential adverse impacts to the Building, such as berms, diversions, and secondary containment. MLVTs for storage of E&P Waste under this policy must include BMPs for emissions mitigation.

Operators proposing to place MLVTs immediately upgradient of water bodies, wetlands, and sensitive environments must include site-specific BMPs that address the protection of those features, these may include: berms and containment, leak detection, monitoring of fill-ups by on-site personnel, remote monitoring, and remote shut-off capabilities.

Decommissioning and Closure

The Operator shall comply with Rule 911 Closure of Oil and Gas Facilities for the decommissioning and closures of MLVTs containing E&P Waste.

Document Change Log

Change Date	**Description of Changes**
July 25, 2025	Updated language to clarify policy
September 23, 2025	Reviewed, ADA accessibility verified, prepared for publication

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