**REQUIREMENTS FOR THE MANAGEMENT OF SPECIAL WASTES ASSOCIATED WITH THE DEVELOPMENT OF OIL AND GAS RESOURCES**
**MONTANA DEQ – SOLID WASTE PROGRAM**
*February, 2012*
***REVISED November, 2015***

## Introduction

The recent resurgence in the development of oil and gas resources in Montana and neighboring states has resulted in numerous inquiries to the Solid Waste Program (SWP) on the requirements for landfill management of wastes associated with the development of these resources. These wastes are commonly referred to as exploration and production, or E&P, wastes. In 1980, Congress exempted specific E&P waste streams uniquely associated with the exploration, development or production of crude oil or natural gas from regulation under RCRA Subtitle C as a hazardous waste.[1] However, this RCRA Subtitle C exemption does not preclude the regulation of these wastes under state solid waste regulations, or other federal regulations.

At the present time, the exempted and non-hazardous E&P wastes are regulated in Montana as a "Special Waste". As defined in 75-10-802(8), Montana Code Annotated (MCA), *"Special waste" means solid waste that has unique handling, transportation, or disposal requirements to ensure protection of the public health, safety, and welfare and the environment.*

To that end, this document identifies the specific minimum requirements for management of E&P wastes at licensed solid waste management facilities in Montana. Although most of these wastes may be managed at licensed Class II facilities, in accordance with the Administrative Rules of Montana (ARM) 17.50.1101, **before** such a facility can accept these wastes, updates to the facility Operation and Maintenance (O&M) Plan are necessary and must be submitted to the Department for approval.

## Waste Characterization - Sample Collection and Analytical Requirements

All licensed solid waste management facilities must document the initial characterization of the E&P waste prior to acceptance and management on site. The initial characterization criteria include:

- Generator information;
- Identification of the waste source location, volume, physical state, and type;
- Identification of the process producing the waste;
- Method of receipt; and,
- Contaminant concentrations.

Because these wastes may also contain naturally-occurring radioactive material (NORM) as well as technologically enhanced naturally-occurring radioactive material (TENORM) constituents, the updated facility O&M Plan must also include the criteria for acceptance and the procedures for the management of the NORM and TENORM wastes. To facilitate the collection samples for waste characterization, the E&P waste generator must collect at least 1 composite sample that consists of 5 sub-samples per 200 cubic yards

[1] *A list of Subtitle C exempt wastes can be found in: http://www.epa.gov/osw/nonhaz/industrial/special/oil/oil-gas.pdf.)*

of contaminated material from the same contaminant source and analyze for the list of constituents in Table 1.

| **Table 1: E&P Waste Characterization Requirements** |
|---|
| Total Petroleum Hydrocarbons by EPA Method 8015(C10-C36)<br>and either<br>Gasoline Range Organics (GRO) by 8015<br>or<br>Total Purgeable Hydrocarbons (C6 to C10) by 8015;<br><br>***-OR instead of the above-***<br><br>Total Extractable Hydrocarbons (C9–C36) by EPH Massachusetts Method **and**<br>Total Purgeable Hydrocarbons (C5-C12) by VPH Massachusetts Method |
| Polynuclear Aromatic Hydrocarbons (PAH) by Method 8270<br>(in accordance with the Department's RBCA guidance Table 1, Tier 1 Surface Soils RBSL's) |
| Volatile Organic Compounds (VOC) by Method 8260b |
| Toxicity Characteristics Leaching Procedure (TCLP) Metals |
| TCLP Benzene |
| Reactive Sulfide |
| Flash Point |
| pH |
| Paint Filter Liquids Test |
| Total Chloride and Specific Conductance |
| Radium-226, Radium-228, Lead-210 for unprocessed E&P wastes<br>Radium-226, Radium-228, Lead-210, Thorium-232 and Polonium-210 for processed E&P wastes |

## Management Options and Requirements

As previously noted, exempt and non-hazardous E&P wastes are currently regulated as a "Special Waste" in Montana in accordance with the provisions of ARM 17.50.509 and ARM 17.50.1115. As a result, additional management requirements are necessary to ensure that these wastes are managed appropriately. Non-hazardous E&P wastes may be landfilled or landfarmed. The acceptance criteria for disposal at licensed Class II landfills is based upon the characteristics of the E&P waste relevant to the various Class II unit design and monitoring elements unique to each facility. Table 2 provides the design criteria relevant to the waste characteristics for disposal of E&P waste into Class II landfills. Table 3 provides a listing of common E&P waste materials, the respective RCRA exemption status, testing requirements, and requirements for approval prior to disposal.

**Table 2: Waste Management/Disposal Criteria***

| ***Landfill Design Requirements*** | ***E&P Waste Limits*** |
|---|---|
| Leachate Collection and Removal System and Synthetic Liner | (TPH+GRO) or (TPH+Total Purgeables) equal to <50,000 mg/kg<br>Ra-226 + Ra-228 $\leq$50 pCi/gm |
| No Leachate Collection System and Engineered clay ** or Synthetic Liner | (TPH+GRO) or (TPH+Total Purgeables) equal to < 50,000 mg/kg<br>Chloride <5,000 mg/kg<br>Ra-226 + Ra-228 $\leq$15pCi/gm |
| Natural clay liner*** | (TPH+GRO) or (TPH+Total Purgeables) equal to < 50,000 mg/kg<br>Chloride < 3,000 mg/kg<br>Ra-226 + Ra-228 $\leq$15pCi/gm |

Class II facilities must maintain the necessary surface water run-on/run-off control systems and are located in areas with suitable hydrogeology, and may or may not be required to perform groundwater monitoring.

*Exceptions to the limitations provided herein may be considered on a case-by-case basis.

**Engineered clay liner consists of a clay liner constructed of appropriate clayey material where the material is laid down in 6-inch lifts and each lift is compacted at 2-3% wet of optimum moisture to achieve a hydraulic conductivity of $10^{-7}$ cm/sec or less.

***Natural clay liner is a liner constructed by scarifying and recompacting the native clay material in which the landfill unit is built.

| Table 3*: Common E&P Waste Materials | | | |
|---|---|---|---|
| ***Description of Waste Item*** | ***Exempt per 40 CFR Part 261.4(b)(5)***** | ***MT DEQ Approval Required prior to Disposal / Other Options*** | ***Required Testing or Recommended Treatment*** |
| Asbestos-containing material | No – subject to specific regulations | Approval per O&M Plan | Comply with state and federal rules for removal and disposal |
| Bags (empty) paper | No | No | None |
| Land clearing vegetative debris, uncontaminated | No | No | None |
| Buckets, detergent (empty) | No | No | None |
| Buckets, grease (empty) | No | No | None |
| Concrete, contaminated from compressor stations, oil, or gas facilities | No | Yes | Test for contaminants of concern on case-by-case |
| Concrete, uncontaminated | No | No | None |
| Containers, empty | No | No | None |
| Drill cuttings | Yes | Yes | Table 1 analytes |
| Barrels, drums, 5-gallon buckets (empty) | No | No | None |
| Fiberglass tanks & pipe (empty) | No | No | Clean, cut, or shred |
| Filters – amine, dehydration, glycol | Yes | Yes | TPH, TCLP Benzene, |
| Filters – cooling tower | Yes (No, if generated in transportation) | Yes | Total Chromium |
| Filters – saltwater | Yes | Yes | TPH, pH, Chlorides, NORM |
| Filters – waste oil (1) entire unit is inside metal container | No | Yes | Separate parts, recycle oil and metal parts |
| Filters – waste oil (2) replaceable fiber or paper filter inside unit | No | Yes | Total Lead and Benzene |
| Iron sponge | Yes | Yes | Allow to oxidize completely to prevent combustion |
| Office trash, routine | No | No | None |
| Metal plates, pipes, cable | No | No | None, recycle |
| Molecular sieves | Yes | Yes | TPH, Total Benzene |
| Muds – drilling | Yes | Yes | Table 1 analytes |
| Muds – sacks of unused drilling mud | No | Yes | Return to vendor or use at other sites |
| Muds – unused additives | No | Yes | Return to vendor or use at other sites |
| "Pigging waste" from gathering line in primary field operations | Yes | Yes | Table 1 analytes |
| "Pigging waste" from transmission lines | No | Yes | Table 1 analytes |
| Pipe scale & other deposits removed from piping and equipment | Yes (No, if generated in transportation) | Yes | TPH, RCRA Metals, NORM |
| Pipe dope, unused | No | Yes | Review MSDS for lead, reuse |
| Plastic pit liners | Yes | Yes | Decontaminate, test for TPH, NORM |
| Pumps, valves, etc… | No | Yes | NORM |
| Rags and gloves, used | No | No | None |
| Sand – produced during exploration | Yes | Yes | Table 1 analytes |
| Soil – containing crude oil hydrocarbon | Yes (No, if generated in transportation) | Yes | RCRA Metals, TPH, Chlorides, NORM |
| Soil – containing lube oil hydrocarbons | No | Yes | RCRA Metals, PCB's, TPH |
| Sulfur – ferrous elemental sulfur and soil contaminated with sulfur | No | Yes | Recover elemental sulfur – case-by-case |
| Sorbent pads – crude oil and exempt | Yes | Yes | RCRA Metals, TPH, |

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| wastes | | | Chlorides, Benzene |
| Sorbent pads – lube oil and other non-exempt wastes | No | Yes | RCRA Metals, TPH, Benzene |
| Tank seals – rubber | No | Yes | Drain, recycle |
| Tower packing | No | Yes | Chromium |
| Water-treatment backwash solids | Yes | Yes | RCRA Metals, NORM |
| Wooden pallets, uncontaminated | No | No | No |

*Adapted from: Texas Commission on Environmental Quality, Waste Permits Division, Regulatory Guidance RG-003, September, 2006

**40 CFR Part 261.4(b) *Solid wastes which are not hazardous wastes.* The following solid wastes are not hazardous wastes:
(5) Drilling fluids, produced waters, and other wastes associated with the exploration, development, or production of crude oil, natural gas or geothermal energy.

## Other Facility Considerations

Since most licensed Class II facilities are operated primarily for the disposition of municipal waste, some planning and adjustment may be necessary for effective use of the landfill's capacity. In addition, examination of the following facility plans and/or operations are required and may necessitate changes based upon the receipt and management of these wastes on-site:

- For facilities required to monitor ground water, an update to the facility Ground Water Monitoring Plan to include the analysis of radionuclides;
- The facility's approved Financial Assurance mechanism must be reviewed to ensure the approved mechanism is adequately funded for closure, post-closure, and corrective action;
- The facility's Closure Construction and Post-Closure Monitoring Plans must be updated as necessary to ensure the closure design, post-closure monitoring, and the closure/post-closure cost projections adequately address any changes due to the acceptance and management of these wastes;
- Modifications of the facility size classification may be necessary based upon the anticipated volume of these wastes the facility receives for management;
- Modification of the facility O&M Plan for receipt and management of E&P wastes as special wastes that includes a plan to monitor and manage ionizing radiation.

These elements of operation should all be considerations before deciding whether or not to add this E&P waste stream to your list of acceptable wastes. Since the volume of E&P wastes may outpace the normal volume of municipal solid waste the facility receives, acceptance of these wastes could very well shorten the remaining life of the facility. Finally, even if the characteristics of the exempted and the non-hazardous E&P wastes are appropriate for disposal at licensed Class II landfills, it is the facility owner/operators decision as to whether or not they will accept this non-municipal waste.

Exempted E&P wastes that exhibit one or more characteristics of hazardous wastes may not be landfarmed. However, the treatment of non-hazardous E&P wastes and 'non-hazardous exhibiting' exempt E&P wastes by landfarming is acceptable at licensed Class II landfills, as long as landfarming is an activity approved by licensure, and management of these wastes at the landfarm is addressed in the approved facility O&M Plan. Landfarms established solely for remediation of E&P wastes are also an option, but must be licensed prior to the acceptance of these wastes for treatment. Facilities needing to expand their current operations either outside their approved landfill footprint, or outside their current license boundary, must initiate the necessary expansion applications as soon as practical. These reviews may take several months to complete.