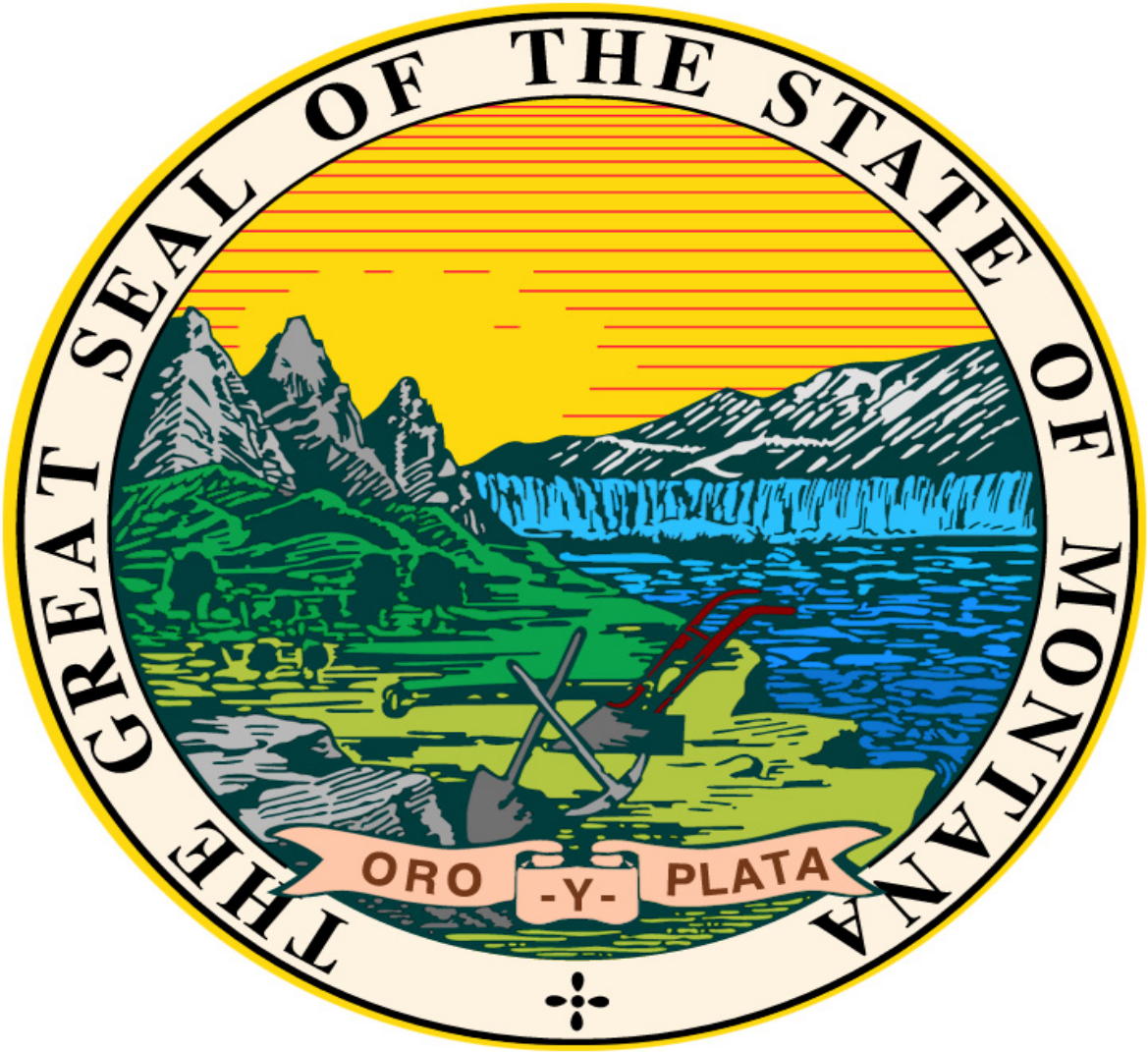
2018

Integrated Waste Management Plan



Montana Department of Environmental Quality
Waste Management & Remediation Division
Waste & Underground Storage Tank
Management Bureau
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EXECUTIVE SUMMARY

Every day solid waste is generated in Montana, including household garbage, construction debris, electronics, recyclables, yard trimmings and other organic and inorganic wastes. The Montana Department of Environmental Quality (DEQ) regulates and manages this waste using a variety of prioritized approaches, such as source reduction, re-use, recycling, composting, and landfilling and incineration.

Every five years DEQ issues an Integrated Waste Management Plan (IWMP) that reports on materials management and source reduction trends in Montana. DEQ receives input from a stakeholder task force that included representatives of local governments, solid waste and recycling entities, environmental organizations, citizens and other interested parties. The report also sets aggressive goals to divert waste from landfills and compares these goals against past targets.

INTEGRATED WASTE MANAGEMENT

Passed in 1991, the Montana Integrated Waste Management Act establishes integrated waste management as the policy for the state to manage municipal solid waste with the least adverse impact on human health and the environment. The Act is found in Title 75, Chapter 10, Part 8, of Montana Code Annotated (MCA). In addition to defining integrated waste management as "the coordinated use of a priority of waste management methods," the Act establishes priorities for waste management, sets a solid waste reduction target, requires state government to implement source reduction/recycling programs and procure recycled supplies and materials, and requires development and implementation of a solid waste management plan.

Integrated Waste Management Hierarchy/Priorities

The integrated solid waste management policy is based on a hierarchy of prioritized approaches to managing waste (Section 75-10-804, MCA). These approaches, in order of priority, are:

1. **Source Reduction** (also Waste Reduction)**:** Preventing waste in the first place.
2. **Reuse:** Giving a second life to a used product or material.
3. **Recycling:** Introducing one or more waste materials or products into a manufacturing process to produce a new product.
4. **Composting:** The controlled decomposition of organic materials by microorganisms.
5. **Landfill and Incineration:** The final destinations for most waste in United States.

Diversion Target Goals

The Act set the goal to reduce, according to the hierarchy, the amount of solid waste generated in the state and established recycling and composting reduction targets. Building on the work of the 1991 Legislature, the 2005 Legislature updated these target goals to better reflect the ability of DEQ to calculate waste diversion rates based on materials recycled and composted (Section 75-10-803, MCA). Currently, licensed facilities voluntarily report these amounts on renewal submissions, and a voluntary survey is sent to all recycling facilities not required to hold a license. Because this survey is not mandatory, some facilities choose not to submit recycling data. Therefore, it is likely that Montana waste diversion rates are higher than DEQ's calculated percentages.

The 2006 IWMP and Section 75-10-803, MCA adopted the updated target goals for recycling and composting:

- 17% of the state's solid waste by 2008
- 19% of the state's solid waste by 2011
- 22% of the state's solid waste by 2012

Montana DEQ uses yearly facility reports and voluntary surveys to calculate yearly diversion rates. A summary of diversion rates achieved since 2004 is given below.

- 2011 – 19.4%
- 2012 – 21.9%
- 2013 – 15.9%
- 2014 – 22.2%
- 2015 – 17.6%
- 2016 – 17.1%

Individual reports can be found at: http://deq.mt.gov/Land/recycle/recycling_statistics_page.

To date, Montana has often met and exceeded the diversion goals set by the 2005 Legislature. These successes can be attributed to increased community based recycling programs as well as focus on diversion of large volume materials such as e-waste, construction and demolition waste, and mercury-containing equipment and devices.

Education and Public Outreach

DEQ promotes the achievement of the Diversion Target Goals through distribution of information to the public, businesses, and industry on source reduction, reuse, recycling, and composting of wastes. Information is available on DEQ's website. Additionally, DEQ regularly presents information at various training events, conferences, and community meetings. Examples of past training events include plastics recycling, waste tire reuse/recycling, construction and demolition reuse/recycling, home composting, and community approaches for rural recycling. DEQ also works to expand the markets within Montana which can use recyclables and other "wastes" productively, thereby eliminating or delaying disposal in landfills. Information on upcoming training events can be found on DEQ's website at http://deq.mt.gov/Land/solidwaste/training.

Landfill Operator Training

Operational practices at municipal solid waste (MSW) landfills can have a major impact on the environment and public health. Training of landfill operators improves landfilling practices and standardizes operations around the state. Prior to state Fiscal Year 2012, DEQ used fees paid by landfills to provide training through a contract with the Montana Association of Counties and Montana State University Extension Service. As a result, 95% of all landfill operators in Montana are Manager of Landfill Operations (MOLO) certified by the Solid Waste Association of North America. Additional types of training offered include Occupational Safety and Health Administration (OSHA) 24-hour and 8-hour Hazardous Waste Operations and Emergency Response HAZWOPER refresher classes, landfill operator safety, household hazardous waste collection events, and composting. Beginning in state Fiscal Year 2012, DEQ assumed the lead role of coordinating the landfill operator training events. Surveys of participants show that quality and value of training opportunities has remained steady, or improved, since training was absorbed by DEQ. For more information on scheduled training events, contact DEQ's Waste and Underground Tank Management Bureau or view the training calendar at http://deq.mt.gov/Land/solidwaste/training

COMMUNITY APPROACHES TO INTEGRATED WASTE MANAGEMENT

Integrated waste management programs provide communities and local governments with the ability to manage costs, control items accepted at landfills, and extend the useful life of landfills. Costs related to solid waste management are increasing for most communities, regardless of whether the landfill is municipally or

privately operated. For most communities, most resources focus on the most expensive, least- preferred management option: landfilling. Effective solid waste cost management plans include concepts from each step of the waste hierarchy, reducing the volume of waste that must be buried and monitored.

First Step:	Source Reduction - avoid generating waste in the first place
Second Step:	Reuse - find an alternative use for the material
Third Step:	Recycling - divert materials and products that may have value from landfill
Fourth Step:	Composting - turn yard and food waste and other organics into a valuable product while conserving landfill space
Final Step:	Landfilling - most expensive, requiring continued monitoring after closures (when waste disposal fees no longer generate income)

Communities can shift focus and resources away from landfills when programs and infrastructures are built to support the alternative management concepts identified in the Montana Integrated Waste Management Act. Successful programs include actively engaging consumers and commercial businesses in source reduction, reuse, and recycling programs.

Rural Recycling

Rural recycling is a challenging but important issue for local and state government. Recycling programs must be developed with logistics of rural areas in mind. These communities are striving to meet recycling and reduction goals; however, they are hampered by their low populations and tax base, limited municipal and county budgets and personnel, low-density housing, and limited commercial development. Though they try to establish infrastructure to recycle, rural communities do not generate enough recyclables to lure large recyclers to their areas, nor do they produce enough recyclables to effectively start a full-scale recycling program of their own. Transportation costs to ship recyclables hundreds of miles for processing are often cost-prohibitive, and the value of the recyclables often aren't enough to pay for the fuel to haul it to market.

To fill this gap, DEQ has promoted the "Hub and Spoke" concept to help rural communities overcome these barriers. The Hub and Spoke concept is dependent on several communities working in partnership to collect and aggregate materials for recycling. For example, five communities all collect recyclables and ship the material to one central community, establishing a volume that economically supports hauling to a recycling business. In May 2011, DEQ provided a rural recycling workshop to bring community representatives together to find solutions to Montana's rural recycling challenges. The outcome was to work to build on the regional recycling approach. Building on the 2011 meeting, DEQ again gathered small communities together in 2012 to discuss waste diversion strategies and successes.

A regional recycling approach helps to overcome the obstacles encountered by individual rural governments. Benefits of this type of approach include increased volumes of recyclables and increased marketing opportunities, as well as:

- Potential for cooperative marketing, which can substantially increase revenues
- Conserved landfill capacity and avoided tipping fees to citizens
- Regional economic stimulus from new collection and processing jobs
- Shared costs for equipment, personnel, processing, transportation, marketing, and facility capital and operating costs

Contracts/Agreements

Contracts and legal agreements are useful tools for providing incentives to help reduce tonnage landfilled, while rewarding and encouraging waste prevention, reuse, recycling, and composting. Economic incentives such as Pay-As-You-Throw, revenue sharing, bonus and penalty payments tied to goals, franchise fees, and similar strategies are used by communities across the country to build successful integrated waste management systems.

Getting Started 101

Below are basic guidelines for revising current waste management practices to include an integrated approach. Earlier versions of this plan included more extensive explanations; the information below includes major points and is designed with rural communities in mind.

Local Government Framework for Implementing an Integrated Waste Management System

1. **Set up a citizens' solid waste advisory committee -** The committee should include both public and private interests as well as local experts. Committee responsibilities should be clearly outlined with specific goals or projects.
2. **Audit the local waste stream -** The information gathered will establish a foundation for any projections, while providing a snapshot of current conditions. DEQ's Materials Management Program can provide waste audit information to communities.
3. **Write a local integrated solid waste management plan -** A local plan addresses the economic conditions and resources unique to each community.
4. **Implement aggressive public education -** Educational campaigns are necessary to spread awareness and encourage participation. Use community partners and existing businesses to help spread the message.
5. **Provide incentives for waste reduction -** Economic incentives encourage the private sector to participate in solving solid waste management problems while supporting local recycling goals. In addition to economic incentives and disincentives, communities can offer awards programs and other public recognition programs to businesses or individuals that reduce waste.
6. **Target large industrial waste components -** Review local industry activities to identify large generators of waste material and work with them to develop alternative management strategies.
7. **Explore cooperative agreements and structures -** Small communities may be able to coordinate recycling drives, taking advantage of higher volumes of materials and lower transportation costs. Communities may be able to share mobile balers, shredders, and crushers.
8. **Build on existing programs -** When possible, build on existing programs to minimize capital costs. Save further costs by using existing container sites, landfills, and transfer stations as part of the new integrated waste management system.

A local integrated waste management plan may include one or more of the following:

- Recycling drop-off bins with marketing to nearest buy-back center
- Roll-off waste containers for disposal
- Waste exchanges, swap programs, yard sales, thrift stores
- Community recycling collection events
- "Buy-recycled" policy for local government
- Rate structure incentives
- Residential curbside collection of recyclables
- Reuse/repair center
- Drop-off for yard waste and windrow composting

- Curbside collection of yard waste and aerated static pile composting with sewage sludge and green wastes
- Collection programs for commercial sector recycling
- Environmentally sound landfill in the region
- Materials recovery facility/transfer station

MONTANA LANDFILLS STATUS/ OVERVIEW

As Montana continues implementing a more integrated approach to solid waste management, it is obvious that landfills are and will continue to be an important part of the state's management of solid waste. As the population of Montana grows, the need for sufficient and properly operated waste disposal facilities also grows. Landfill capacity assurance is the process of planning for the future so that local governments and their citizens can be assured they will have access to adequate solid waste disposal capacity.

Although Montana seems to have limitless space for landfills, the costs of siting, operating, and maintaining landfills are expensive and monitoring and controlling leachate continue well into the future. Thirty-year post-closure monitoring and care regulations make it clear that no landfill can ever be forgotten. Nationally, communities are burdened by expenses from poorly sited, inadequately maintained, and improperly closed landfills. Montana has largely avoided such misfortune, but the missteps of others underline the importance of environmentally sound landfills. To avoid permitting costs, and the environmental impacts of new landfill units, it is important to conserve space in properly sited and operated landfills.

Siting and constructing a landfill is sometimes difficult due to public perception and the stigma associated with landfills. Therefore, it is increasingly important for citizens, local governments, and DEQ to work together to plan for future landfill needs. Everyone involved must be aware of trends in population growth, waste generation rates, new rules, and other factors that influence the available landfill capacity in Montana.

Montana Municipal Solid Waste

Municipal solid waste (MSW) refers to those materials that historically have come from municipal sources and are disposed at municipal landfills. MSW may be generated in residential, commercial, institutional, or industrial settings. MSW includes: packaging, newspapers, miscellaneous paper, magazines, glass and plastic bottles, cardboard, aluminum and steel cans, wood pallets, food scraps, yard waste, furniture, appliances, tires, electronics, clothing, and batteries. These materials are characterized by product type or by material.

Waste Generation Rates

Records from waste management facilities evaluated by DEQ indicate the generation of MSW in Montana increased from 1,697,085 tons in 2011 to 1,803,435 tons in 2016, and that per-capita waste generation increased from 9.3 pounds/day/person in 2011 to 9.7 pounds in 2016. Using the 2016 census estimated population of 1,023,391, each day Montanans contributed an average 7.7 pounds to the state's landfills and recycled 2 pounds of solid waste for a diversion rate of 17.1% (http://deq.mt.gov/Land/recycle/recycling_statistics_page).

Montana's per-capita waste generation statistics are skewed as they include wastes that do not meet the standard definition of municipal solid waste (MSW). For example, industrial as well as construction and demolition wastes are not considered true MSW, yet they often end up in Montana Class II landfills because

there is no other place for them. In many instances, these wastes are disposed of and weighed with MSW, falsely elevating state totals. Because Montana does not track the type of MSW going into landfills, DEQ uses national statistics for MSW material percentages. The following chart shows the Environmental Protection Agency's (EPA) estimated national breakout of MSW for 2015.

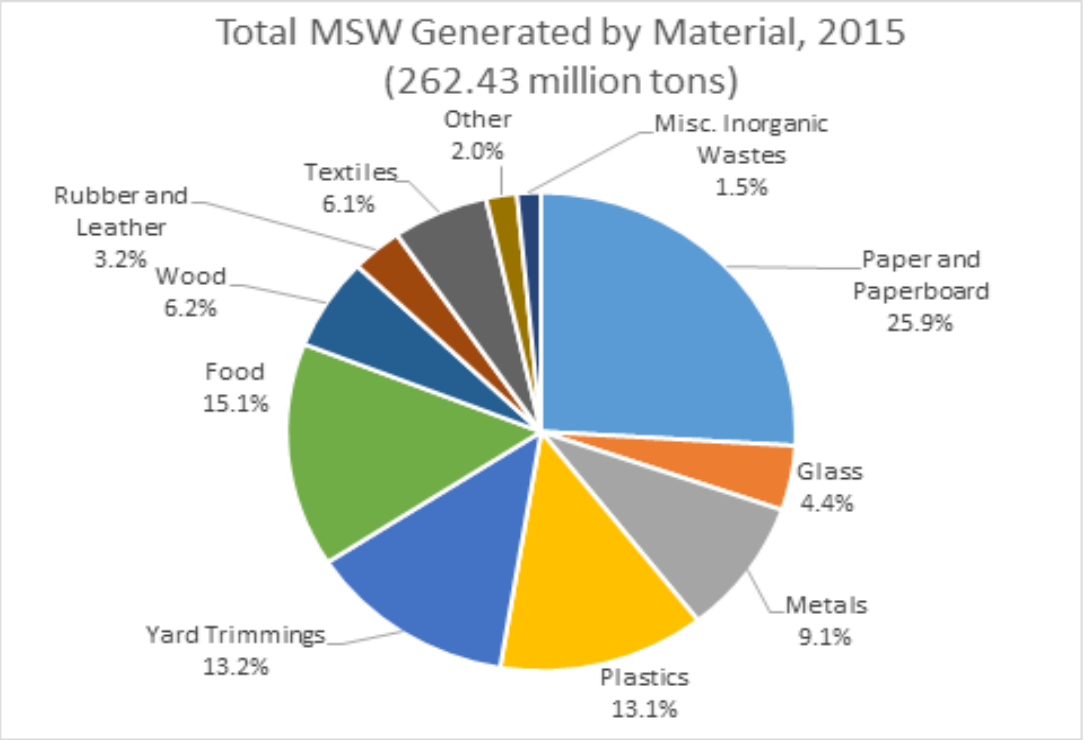

Figure 1: Advancing Sustainable Materials Management: 2015 Fact Sheet, EPA

Existing Disposal Capacity

Currently, there are 30 licensed Class II landfills in Montana, compared to 29 in 2011, 31 in 2006, 59 in 1993, and 87 in 1979. They must meet federal Subtitle D and Montana requirements for liner design, leachate collection, methane monitoring, and other criteria. Overall, the average life of these facilities is about 43 years. However, because of the population growth occurring in Montana, landfill space is being used at a higher rate than anticipated.

Future Capacity Needs

The Montana Department of Commerce Census and Economic Information Center projects that Montana's population will continue to grow at a moderate rate of 0.79%. This growth rate is middle-of-the-road for the United States. The population is expected to continue to shift to the high-density centers in Gallatin, Yellowstone, and Lewis and Clark Counties, and to the four-county region of Flathead, Lake, Missoula, and Ravalli along the western slope of the Rocky Mountains. Montana's rural areas will continue to lose people while the urban areas grow. In 2010, these seven counties contained just over 57% of Montana's population. Forecasts show Montana's population will grow 14% over the next 30 years, reaching 1.16 million by 2030.

Solid Waste Importation into Montana

Montana's moratorium on importation of out-of-state waste ended in 1993. Given the demographics of Montana and its neighboring states, the most efficient and reasonable management of waste involves transportation across state borders. Montana imports solid waste from Wyoming, North Dakota, Idaho, Washington, and Yellowstone National Park. Montana exports solid waste to Idaho and North Dakota.

Montana assesses a fee of $0.27 per ton of imported solid waste in addition to the standard tonnage-based disposal fee of $0.40 per ton. This fee is based on administrative costs to the State of Montana. The total imported tonnage for facilities accepting out-of-state waste has averaged 10,860 from FY2013 through the FY2017, with one facility accepting 86,230 in FY2017. Although export tonnages are not tracked by DEQ, the agency estimates that exports and imports are well balanced except for the large amount accepted by a single facility in FY2017.

Technology Alternatives

Nationally, there has been little recent development in solid waste technology and Montana follows this trend. In fact, facilities that were using promising diversion technologies are currently not operating, or not taking diverted products (e.g., tire-derived fuel at Holcim Cement and product substitution [glass] at Ash Grove Cement and Holcim Cement).

While not solid waste diversion, the City of Billings and Flathead County collect biogas at their landfills to use as a fuel source.

LANDFILL REGULATIONS SUBTITLE D OVERVIEW: FEDERAL REGULATIONS 40 CFR 257 and 40 CFR 258

These regulations specify minimum criteria for municipal landfills, including location, operation, design, groundwater monitoring, corrective action, closure and post- closure care, and financial assurance. In 2015, the EPA promulgated rules on the disposal of coal combustion residue (CCR) and designated CCR as a Subtitle D waste, setting standards for landfilling or surface impoundment under 40 CFR 257 Subtitle D. The rules establish requirements for both existing and new CCR sites, including lateral expansions of any existing sites. These rules are "self-implementing" by regulated industries with an effective date of October 19th, 2015. The CCR rule does not apply to coal residue which is placed in coal mines or MSW landfills. Montana has not yet promulgated State rules to implement CCR disposal requirements due to ongoing litigation at the national level that continues to change the federal rule.

Subtitle D regulations also include regulations pertaining to garbage, including: food containers and coffee grounds, non-recycled household appliances, refuse such as metal scrap and construction materials, sludge from industrial and municipal wastewater facilities, and waste from drinking water treatment plants. Hazardous wastes exempted from Subtitle C regulations —from households and conditionally exempt small-quantity generators — also fall under Subtitle D.

As the regulatory agency for RCRA Subtitle D, EPA approved the State of Montana's MSW program in 1993 (as set out in the Administrative Rules of Montana (ARM) 17.50.501 through 17.50.542 and 17.50.701 through

17.50.726). Montana's program was developed by DEQ's predecessor agency (Department of Health and Environmental Services) under the authority of the Montana Solid Waste Management Act (75.10.201-233). Montana's Solid Waste program protects public health and the environment, while providing the maximum flexibility allowed by EPA in setting alternative standards for the siting, design, operation, monitoring, and closure of municipal (Class II) landfills and CCR landfills or impoundments.

The text of the CFR requirements, as well as Montana-specific information, follows. 40 CFR 257 and 258 can be found at: https://www.ecfr.gov/cgi-bin/ECFR?page=browse. Montana's solid waste laws and rules can be accessed through DEQ's website at: http://deq.mt.gov/Land/SolidWaste/LawsRules.

Small Community Exemption

Small MSW landfills that meet all the following criteria may be exempted by DEQ from landfill design criteria described in ARM 17.50.12-13:

- Receive less than 20 tons of waste per day on an annual average
- Have no evidence of existing groundwater contamination from the landfill
- Receive 25 inches or less of precipitation per year
- Serve a community for which no practicable waste management alternative exists

DEQ considers "practicable waste management alternative" to mean a complying MSW landfill, transfer station, or materials recovery facility within 100 miles of the small community landfill that can accept waste for an annual cost of less than 1% of the median household income.

If an exemption is granted, the landfill is not required to be constructed according to an EPA-prescribed design, or a design that DEQ approves, demonstrating that the uppermost aquifer will be protected from contamination. However, all location, operation, closure and post-closure care, groundwater monitoring, and corrective action requirements still apply. These landfills must also comply with all financial assurance requirements. DEQ has the authority to revoke an exemption if any groundwater contamination is found or if any of the required conditions can no longer be met.

The small community exemption has not been implemented in Montana as no community has demonstrated the need for the exemption. DEQ has the flexibility to approve alternative design criteria based on geologic features, which is more protective of the environment than exemptions based on size. In addition, many small landfills have closed over the past 21 years because of the costs associated with required groundwater monitoring, methane monitoring, and financial assurance requirements.

Location Criteria

MSW landfills cannot be located or operated in wetlands, floodplains, fault areas, seismic impact zones, or unstable areas without a DEQ-approved demonstration. Since landfills attract seagulls, crows, vultures, and other scavenger birds, MSW landfills cannot be located with 10,000 feet of an airport that has jet aircraft landing or taking off, or within 5,000 feet of airports used by propeller aircraft. Exceptions may be made if the operator of the landfill can demonstrate that the facility does not pose a bird hazard to aircraft.

Much of western Montana lies in seismic impact zones. DEQ has the authority to approve landfills in seismic impact zones if all containment structures are designed to adequately resist the expected impact of an earthquake. Landfills that existed in restricted areas before the 1993 adoption of the regulations were evaluated on a site- specific basis. Those sites that were designed, or which could be re-engineered, to address the issues continue operation. Fifty percent of Montana's landfills have closed since 1993.

CCR landfills or surface impoundments are required to meet specific location criteria, such as no placement above the uppermost aquifer, in a wetland, in fault areas or seismic impact zones or unstable areas. Current sites must provide DEQ with engineering plans to enhance or meet location restrictions, while any future sites will be built in compliance with the new EPA standards and requirements. CCR sites are required to notify the MTDEQ of specific actions taken to come into compliance with Subtitle D.

Operational Criteria

Owners and operators of MSW landfills must comply with the following:

- Implement procedures for prohibiting the dumping of regulated hazardous wastes and PCB wastes.
- Conduct random inspections of incoming loads, maintain records of inspections, train workers to recognize hazardous waste, and notify state and/or federal officials of unauthorized materials.
- Cover disposed waste with six inches of earthen material at the end of each operating day (but more frequently if necessary).
- Prevent or control populations of disease vectors such as rodents.
- Ensure that the concentration of methane gas generated by the landfill does not exceed set limits in structures or at the facility's boundary, by implementing methane monitoring programs. If methane gas concentrations do exceed those limits, take necessary steps to reduce them and notify DEQ.
- Ensure that the landfill meets all applicable air quality standards.
- Conduct open burning according to applicable regulations and never burn mixed MSW.
- Control public access, prevent unauthorized traffic, and prevent illegal dumping.
- Design the landfill to prevent run-on to its active portion during the peak of a 25-year storm.
- Control runoff from the active portion of the landfill in the event of a 24-hour, 25-year storm.
- Prevent the discharge of pollutants into any water which would violate federal or state standards.
- Refuse to accept bulk, non-containerized, or large containers of liquid wastes.
- Record and retain information relating to all aspects of the ARM 17.50.11-12, which regulate landfill operation and design.
- Record a notation to the deed of the land where the facility is located that notifies any potential purchaser of the land, in perpetuity, that the land was used for a solid waste management system, and that its use is restricted under ARM 17.50.1404(3)(c).

Under ARM 17.50.5 and 17.50.10-14, DEQ has the authority to approve alternate daily cover that meets performance standards, provide flexibility governing the number and location of methane monitoring wells, and approve alternate waste-screening methods if the landfill operator ensures that incoming loads do not contain regulated hazardous or PCB-containing waste. Federal law, however, does not allow any state to waive random inspections for hazardous waste, methane monitoring, groundwater monitoring, run-on/runoff controls, and recording-keeping requirements.

Design Criteria

MSW landfills must employ design standards that have been proven to be protective of human health and the environment in most circumstances. These design standards include — for any new landfill or for the lateral expansion of an existing landfill — a standard composite liner consisting of a minimum 2-ft layer of soil, compacted to specifications, directly overlain by either a 30-mil polyvinyl chloride (PVC), or a 60-mil high-density polyethylene (PE), flexible membrane liner in uniform contact with the soil (see ARM 17.50.1202(5) and 1204).

DEQ may accept alternative designs based on performance standards and local geological and hydro-geological conditions, and allow the use of other technology that the applicant can demonstrate is protective of the environment in site-specific circumstances. For example, in areas where natural clay soils are unsuitable, a geo-synthetic clay liner may be approved. DEQ also has the authority to approve various low-cost options for leachate collection systems and alternative landfill covers, depending on site-specific circumstances. CCR landfills and surface impoundments are required to install a composite liner as well as a leachate collection and removal system.

Groundwater Monitoring and Corrective Action

Under ARM 17.50.13, all MSW landfills must monitor groundwater. Each monitoring system must consist of a sufficient number of wells, installed at appropriate locations and depths, to yield groundwater samples from the uppermost aquifer. Each system must include sampling of wells up-gradient and down-gradient from the landfill. An operator must conduct monitoring semiannually over the life of the landfill and during the post-closure period. Samples must be analyzed for at least 15 heavy metals and 47 volatile organic compounds.

If elevated levels of any of these metals or compounds are detected, the operator must implement an assessment monitoring program as specified in ARM 17.50.1307. If the groundwater assessment monitoring shows that contamination exceeds legal limits, ARM 17.50.1308-10 prescribes a corrective action program. Should contamination be detected at any CCR sites which are unlined surface impoundments, the corrective action will include a cleanup process and initiate the closure process for that site.

DEQ has the authority to suspend monitoring requirements if the landfill operator demonstrates that there is no potential for contamination of ground water.

Closure and Post-closure

Under ARM 17.50.14, each MSW landfill must prepare a closure and post-closure care plan, and submit it to DEQ for approval. The closure process must include notification to DEQ of when the closure will occur, and placement of a final cover over the landfill. The design features of the final cover are specified in the rules (ARM 17.50.1403) and include minimization of infiltration and erosion. However, DEQ has the flexibility to allow an alternative final cover design based on site-specific conditions.

The post-closure plan must describe the integrity and effectiveness of the final cover, as well as the leachate collection system, groundwater monitoring system, and the gas monitoring system, and outline how they will be maintained for 30 years after closure. DEQ may choose to approve extensions of deadlines for closure, increase or decrease the post-closure monitoring period or frequency, and even allow the operator to suspend monitoring entirely.

Financial Assurance

Under ARM 17.50.540, landfill operators are required to provide an annual cost estimate for a third party to perform closure, post-closure care, and any corrective action. They are also required to provide and fund "financial assurance," which will enable DEQ to pay these costs should the operators run out of funds. The mechanism may be a trust fund, insurance policy, surety bond, letter of credit, local government financial test, or a combination of these.

SPECIAL WASTES

By statute, the term "special waste" is defined as a solid waste that has unique handling, transportation, or disposal requirements to ensure protection of the public health, safety, and welfare and the environment (Section 75-10-802, MCA). Special wastes are identified for specific attention because of the toxicity of the wastes and the higher possibility of contamination from small amounts of the wastes. Occasionally, materials are identified as special wastes because of special handling that is needed.

Hazardous Waste Conditionally Exempt Small Quantity Generators

Hazardous wastes are regulated under the Resource Conservation and Recovery Act (RCRA), Subtitle C. A waste is considered hazardous if it has one or more of the following characteristics, or if it appears on any list of hazardous wastes contained in 40 CFR 261.20 through 261.33.

1. Ignitable: A liquid with a flashpoint below 140˚F.
2. Corrosive: A liquid with a pH less than or equal to 2.0 or greater than or equal to 12.5. Also, a liquid that dissolves steel at an established rate.
3. Reactive: Waste that is unstable or undergoes rapid or violent chemical reaction with water or other substances (waste bleaches and other oxidizers).
4. Toxic: Waste that contains high concentrations of heavy metals (i.e., lead, cadmium, mercury, etc.), specific pesticides, or select volatile organic compounds that could be released into the environment.

"Acutely hazardous" waste is a waste so dangerous in small amounts that more stringent regulation is warranted.

The Montana Hazardous Waste Rules, which incorporate by reference federal Resource Conservation and Recovery Act (RCRA) Subtitle C regulations, classify generators of hazardous waste according to the total amount of hazardous waste they generate in a calendar month, measured in pounds.

Conditionally exempt small quantity generators (CESQGs) are businesses that generate no more than 220 pounds of HW (100kg) in any month, or no more than 2.2 pounds (1kg) of an acutely hazardous waste in any month. CESQGs can dispose of their hazardous waste (HW) in a Class II landfill if allowed by the landfill operator. CESQGs are also exempt from reporting to DEQ how much hazardous waste they have generated and/or disposed. Therefore, the amounts of CESQG hazardous waste disposed of in Montana landfills are unknown.

Management

Montana's "small" and "large" quantity generators of hazardous waste shipped a total of 73,280 tons of material to out- of-state handlers between 2012 and 2016. For these sizes of generators, handling, transportation, storage, and disposal of hazardous waste are regulated by stringent federal law and rules. Hazardous waste must be sent to a treatment, storage, and disposal facility that is designed and permitted to accept hazardous wastes. There are no such facilities in Montana open to the public; therefore, all hazardous waste generated in Montana by large and small generators must be shipped out-of-state.

Environmental Issues

Waste from CESQGs can be a safety concern to landfill personnel as wastes can cause fires, explosions, and the release of toxic fumes. Additionally, wastes can react with other landfill materials to cause an increase in production and toxicity of leachate.

Economic Issues

Proper collection, storage, transportation, and disposal of hazardous waste can be costly to generators. However, disposal of hazardous waste to municipal landfills may transfer costs to landfill budgets for the proper treatment of potential leachate toxicity.

Coal Combustion Residuals (CCR)

CCR, also referred to as coal ash, is primarily produced from the process of burning coal in coal-fired power plants. It also encompasses a number of by-products, including:

- Fly Ash: a powdery material mostly composed of silica made from burning finely ground coal in a boiler.
- Bottom Ash: a coarse and angular ash particle that forms at the bottom of the coal furnaces.
- Boiler Slag: molten bottom ash from slag tap and cyclone type furnaces that forms into pellets with a smooth glassy appearance after it is cooled with water.
- Flue Gas Desulfurization Material: a material leftover from the process of reducing sulfur dioxide emissions from a coal-fired boiler. It can be a wet sludge consisting of calcium sulfite or calcium sulfate, or a dry powered material that is a mixture of sulfites and sulfates.

Other types of by-products are:

- Fluidized bed combustion ash,
- Cenospheres, and
- Scrubber residues.

Management

Wet CCR in slurry form are generally disposed into impoundments. Dry CCR is either beneficially reused or disposed into landfills.

Currently only one facility in Montana operates a CCR landfill unit. This CCR unit is located at the City of Hardin's Class II landfill. The CCR unit at the Hardin Class II landfill meets and/or exceed all regulation put forth by the proposed federal CCR rules.

Environmental Issues

Beneficial reuse of CCR includes reduced greenhouse gases, reduced materials entering landfills, and virgin resource reduction. Leaking or failed impoundments both nationally and in Montana precipitated federal regulations specific to CCR.

CCR sites must be operated to minimize environmental impacts and meet the following minimum standards:

- Control water run-on and run-off in order to minimize the amount of water entering the unit;
- Implement prevention measures for erosion, water discharges, and the creation of leachate;
- Control measures in place to protect against run-off releases to surface waters;
- Control measures in place to prevent flood flows;
- Monitor groundwater with a system of monitoring wells, sampling procedures and data analysis;
- Detection of hazardous constituents will immediately require corrective action and clean up;

- Any hazardous detection at unlined surface impoundments will result in closure of those sites;
- Minimize fugitive or windblown dust emissions;
- Conduct structural stability inspections, weekly, monthly and annually, including an annual safety assessment, and hazard potential classification assessment;
- Record facility compliance actions and keep with operating records;
- Establish and maintain a publicly accessible internet site which holds facility compliance and operating records.

Economic Issues

Economic benefits include reduced costs associated with coal ash disposal, increased revenue from the sale of coal ash, and savings from using coal ash in place of other, more costly materials.

Household Hazardous Waste (HHW)

Leftover household products that contain corrosive, toxic, ignitable, or reactive ingredients are considered HHW. Products such as paints, cleaners, oils, batteries, and pesticides that contain potentially hazardous ingredients require special care for disposal.

Management

HHW in any amount is exempt from hazardous waste regulation because it is generated by households, even though the constituents of that waste might be identical to hazardous wastes generated by industry. HHW can be legally disposed of in a MSW landfill. Because HHW is exempt from hazardous waste regulation, DEQ does not collect data on amounts going into municipal landfills. However, EPA estimates that each person in the U.S. produces an average of four pounds per year (http://www.epa.gov/region9/waste/solid/house.html). Assuming that Montana reflects the national statistics, it is estimated that 1,978.83 tons of HHW were disposed of in Montana landfills in 2017.

In response to customer request and landfill need, several communities across Montana have either established permanent HHW take-back services, or schedule periodic collection events which are permitted by DEQ. DEQ uses the Earth 911 website (http://www.earth911.org/), newspaper and radio ads to communicate where permanently licensed locations for HHW collection exist. Additionally, a spreadsheet listing landfills that offer HHW collection can be found on DEQ's website (http://deq.mt.gov/Land/solidwaste) under the heading "Who Accepts What Waste." For those local governments offering periodic HHW collection, DEQ will list these events on the program calendar at http://www.deq.mt.gov/Recycle/calendar.mcpx.

Environmental Issues

Household products contain many of the same toxic chemicals used in industry, small businesses, and agriculture. While consumer products often come in smaller sizes or contain lower concentrations of hazardous ingredients, the shelves of grocery and hardware stores contain a wide variety of hazardous products, including some with high concentrations of hazardous ingredients. For example, certain drain-cleaning products are 100% sodium hydroxide, and mothballs are 100% naphthalene. When no longer useful, these products exhibit all the properties of industrial hazardous waste and need to be handled with extreme care during use, storage, and disposal to avoid health or environmental damage.

Economic Issues

Proper collection, storage, transportation, and disposal of HHW can be costly to generators and/or local governments. Disposal of HHW in municipal landfills may ultimately cause an increase to landfill budgets to offset costs for proper treatment of potential leachate toxicity.

Mercury-Containing Equipment, Switches, and Bulbs

Mercury can be found in pressure regulators, thermometers, thermostats, switches, appliances, clothes irons, electronics, light bulbs, and other common items. The majority of products contain only small amounts of mercury. However, the sheer volume of mercury-containing products that enter the waste stream raises concern about the potential pollution of natural resources and threats to human health. Many mercury-containing items can be classified as either HHW (see previous section) or as Universal Waste (UW). When mercury-containing items are handled as UW, regulations have been streamlined to make collection and recycling of these materials easier for businesses and local governments, ARM 17.53.1301 adopts and incorporates by refence the Federal Universal Waste Rules 40 CFR 273.

Management

Depending on generator and handling procedure, mercury-containing devices can fall under the CESQG, HHW, or UW categories. Although many different types of products can contain mercury, this section focuses on thermostats, vehicle switches, and fluorescent tubes/ compact fluorescent lights (CFLs).

Thermostats: Montana passed the Mercury-Added Thermostat Collection Act in 2009. See Title 75, Chapter 10, part 15, MCA. This law requires thermostat manufacturers to offer a take-back program within the state and mandates that wholesalers in Montana accept mercury-containing thermostats for recycling. Since passage of the law, the Thermostat Recycling Corporation (TRC) has increased its outreach effort to Montana wholesalers, inviting them to participate in its mercury-containing thermostat collection program for a one-time fee of $25. TRC is a non-profit financed by Honeywell, White-Rodgers, and General Electric, which all manufacture thermostats. The law also encourages local government to participate in the program, and offers thermostat recycling at municipal landfills. TRC has limited collection points in Montana, which can be found at www.thermostat-recycle.org.

Vehicle switches: Mercury-containing switches were used in many vehicles manufactured before 2003. Because used vehicles are usually recycled for their steel content, recovering the mercury-containing switches before the vehicles are melted down significantly reduces mercury emissions resulting from that process. To that end, EPA established the National Vehicle Mercury Switch Recovery Program (NVMSRP) in 2006, collaborating with industry, environmental groups, auto dismantlers, and state officials. The program's goal is to reduce up to 75 tons of mercury emissions from steel electric-arc furnaces (EAF) by 2017, which is when EPA expects that most vehicles with mercury- containing switches will no longer be in service. To support NVMSRP, the automotive industry established the End of Life Vehicle Solutions Corporation (ELVS), which assists program participants in implementing the switch recovery program. ELVS initially offered financial incentives for participants as well, but those funds are no longer available. Although the incentives for the collection of the mercury switches had ended, the ELVS program has been extended and will continue to accept mercury switches until December 31, 2021. More information about this program can be found at http://elvsolutions.org/.

Fluorescent Tubes/CFLs: Few community recycling opportunities for CFLs exist in Montana, although the issue is getting increased attention nationally and more companies are offering take-back programs. In Montana and elsewhere, new building codes, federal regulations, and high energy costs are driving consumer and business interest in CFLs, which are highly energy efficient. CFLs save about $30 in electricity costs over the lifetime of the bulb and last ten times longer than incandescent bulbs. Montana utility companies, along with state and local governments and private businesses, are working together to increase awareness and acceptance of CFLs.

As the cost of comparable LED bulbs decreases, there will be a decrease in the demand for CFLs because LED's are even more efficient and do not contain mercury.

Environmental Issues

Mercury occurs naturally in air, water, and soil in several forms: elemental (metallic) mercury, inorganic mercury compounds, and organic mercury compounds. Mercury can affect the human nervous system and cause harm to the brain, heart, kidneys, lungs, and immune system.

Economic Issues

EPA continues to develop stringent regulations limiting the use of mercury in consumer products. It is unclear how the financial costs of managing mercury in compliance with federal regulations will be addressed by industry and government stakeholders. EPA also works with industry to develop voluntary and mandated take-back programs for some mercury-containing equipment. Over the long term, EPA predicts that mercury will have little value as a commodity due to the success of global efforts to successfully decrease its industrial use.

Medical /Infectious Waste

Medical, or infectious waste, is any waste capable of transmitting a disease to humans. It includes the blood-saturated wastes from patients with infectious diseases, certain laboratory wastes, and used healthcare items designed to cut or puncture. Examples include bandages, lancets, syringes, microbiological cultures, blood and tissue specimens, and personal care items. Most medical or infectious waste is generated in hospitals; however, it may be generated in numerous other settings, including clinics, dental offices, veterinary offices, nursing homes, laboratories, and private homes.

Management

In 1991, the Montana Legislature passed the Infectious Waste Management Act, Section 75-10-10, MCA, to set standards for the storage, transportation, treatment, and disposal of infectious waste. The Act requires that generators separate infectious waste from regular waste at the point of origin and that it be stored in specially-marked containers in a secured area until it is rendered noninfectious.

Sharps waste, such as hypodermic needles, must be placed in rigid "Sharps" containers. Infectious waste that has been treated and rendered non-infectious by one of three methods — incineration, steam sterilization, or chemical sterilization or equivalent method (Section 75-10-1005(4)(a)(ii), MCA) — may be disposed of in a Class II municipal solid waste landfill. The Act requires the state licensing board of any profession or facility that generates infectious waste to ensure compliance with the provisions of the Act. DEQ is charged with regulating the transportation and disposal of infectious waste.

Incineration waste managers may treat and dispose of infectious waste through "incineration with complete combustion that reduces infectious waste to carbonized or mineralized ash" (Section 75-10-1005, MCA). Two medical treatment facilities operate in Montana, treating wastes generated by their associated facilities. DEQ regulates both air emissions from these incinerators and solid waste aspects of the facilities. In addition, there is one commercial autoclave in the state that treats infectious waste from Montana and surrounding states. In 2008, this facility collected and treated 1,611.77 tons of infectious waste. After being autoclaved at 290 degrees Fahrenheit and 45 pounds per square inch pressure of saturated steam for 38 minutes, the now-noninfectious waste is transported to a landfill where it is placed in a specially designated area for disposal. It is immediately covered. All medical waste containers are cleaned at the company's warehouse/processing facility by heat and chemical sterilization. They are then stored and distributed for reuse by customers.

Environmental Issues

When burned, hospital waste and medical/infectious waste can emit various air pollutants, including hydrochloric acid, dioxin/furan, and the toxic metals lead, cadmium, and mercury. However, 85-90% of hospital waste is not infectious. Perhaps the greatest environmental impact medical facilities have on the waste stream is the large volume of waste they generate. These facilities commonly use disposable items, most of which may be necessary to control infection. Nonetheless, medical facilities should examine the opportunities for source reduction, reuse, and recycling of all their waste streams.

Economic Issues

Following the adoption of stricter air emission rules, all but two medical auto-claves in Montana have ceased operation due to the cost of environmental compliance. The remaining two incinerators handle only their own waste. Two other medical facilities autoclave and landfill their own waste. The remainder of medical waste generated in Montana is stored and transported to the one commercial autoclave, located in Butte.

Waste Tires

EPA estimates that the U.S. generates approximately 290 million waste tires per year, or approximately one tire per person per year (https://archive.epa.gov/epawaste/conserve/materials/tires/web/html/faq.html). Although DEQ does not track tire disposal rates specific to Montana, tire dealers estimate a replacement rate of 0.75 tires per person per year. Even using conservative estimates, Montana generates approximately 783,000 waste tires per year, based on Montana's current population of just over a million people (per the 2017 Census figures).

Management

Scrap tires present unique recycling and disposal challenges because they are heavy, bulky, and made from a variety of materials. Quantity matters in economy of scale, and commercial scrap tire processing operations need 2-3 million tires a year to be efficient. Unfortunately, developing alternative uses for waste tires in Montana has lagged due to the low production of waste tires and lack of local recycling facilities. Montana does have a few success stories from civil engineering projects using scrap tires. The Yellowstone Park Service, The Micheline Corporation, and KB Industries used a product called Flexipave (https://yellowstoneinsider.com/tag/kbi-flexi-pave/) to replace asphalt paths within Yellowstone Park, which uses one tire for every three-square feet.

Retreading also saves millions of scrap tires from being disposed of each year. According to the Rubber Manufactures Association, nationally, 85% of the scrap tires have markets: 45% of tires are used for Tire Derived Fuel (TDF), 3% are exported, 10% are ground rubber, 19% are used in civil engineering projects, 4% is diverted, 10% is unknown, and 9% is landfilled.

Montana has three licensed tire landfills in the state and collectively these three bring in a total of 17 thousand tons of tires annually. The top market categories for scrap tires nationally are still TDF, Ground Rubber, and Civil Engineering Applications. Currently, there no TDF facilities in Montana. The need for more viable markets remains.

Environmental Issues

Piles of waste tires pose health threats. Disease carrying pests such as rodents may live in and among the tires, while mosquitoes will breed in the stagnant water that collects inside them. Several varieties of mosquitoes can carry deadly diseases, including West Nile, Zika, yellow fever, encephalitis, dengue, and malaria. Short of removing the piles, mosquito control and eradication programs are difficult.

Open and uncontrolled burning of waste tires may also pose a risk to human health and the environment. Chemical composition tests on waste rubber show that it contains numerous toxic and hazardous pollutants. Because open, uncontrolled tire fires are difficult to extinguish, large amounts of toxins may be released into the air, soil, and groundwater.

Tires occupy a large space in landfills. They are not easily compressed and nearly 75% of the space occupied by a whole waste tire is dead space.

Economic Issues

Although the recycling or reuse of waste tires is a business opportunity, it is one that is still in the development stage in Montana. The costs associated with it are generally too onerous for a company without some type of government assistance. Any business interested in starting a waste tire reuse/recycle program should evaluate the following issues:

- The number of waste tires available within a 200-mile radius
- The types of tires available — passenger tires, light truck, etc.
- The amount that can be charged to collect the tires
- Potential customers for the recycled material
- The ultimate end-market — such as landscaping material, playground cover, or engineering-grade powders
- Tire composition is changing and making crumb rubber specifications hard to meet
- The tax credit for TDF has expired
- Health concerns for ground rubber has slowed the market

Waste Carpet

Carpets are manufactured to withstand years of wear and are difficult to manage as scrap. Because carpets consume large amounts of petroleum-based materials, industry efforts are leading the way in carpet recycling. Carpet recycling began in Georgia, when Interface Carpet started to decrease its use of nonrenewable fuels and increase sustainability. It grew into an industry-wide effort through the Memorandum of Understanding (MOU) for Carpet Stewardship, a voluntary agreement among EPA, industry, non-governmental organizations (NGOs), and state governments. The MOU set a national goal to divert 40% of scrap carpet by 2012 through reuse, recycling, cement kilns, and waste-to-energy. A third-party organization, Carpet America Recovery Effort (CARE), was established to coordinate efforts. The market for scrap carpet is driven by industry in recognition of the material's value as a recycled commodity and, in some cases, an alternative fuel for the recycling operations.

According to the 2016 CARE Annual Survey Results of the U.S. Carpet Recycling Industry, the recovery rate of post-consumer carpet in the U.S. was 14% — down 1% from 2015. The materials flows were as follows:

- Recycled Output (reuse plus recycle) — 33%
- Waste-to-Energy — 11%
- CAAF and kiln output — 18%
- Resin and molding applications — 72%, up from 65% in 2015
- Carpet face fiber — 3% of recycled output, down from 13% in 2015
- Carpet backing — 8%
- Other applications — 18%

Management

Currently, Montana does not have well-established carpet recycling activities, and most waste carpet is generally transported and disposed of in a municipal landfill. One known carpet recycling program available to Montana consumers is offered by Pierce Flooring and Design, a regional retailer with eight stores in the state. A semi-trailer is located at each store to provide temporary storage and final transport of the used carpet to an out-of-state recycling processor. Pierce generally ships to a processor located in either Washington or California. Pierce pays the freight charges and the processor fees to accept the scrap material. Pierce staff state that the recycling program is a budget item and does not generate revenue for the retailer. However, the company saves money on landfill tipping fees and expects the program to become cost-neutral as it matures.

Environmental Issues

Carpet manufacturing is an energy-intensive process that creates a petroleum-based final product. Scrap carpet can be recycled into commodity-grade resins and fibers, which then have market value. Scrap carpet in landfills is somewhat difficult to manage due to its weight and bulkiness.

Economic/Social Issues

There are collection and consolidation activities for carpet in Montana, but there are no processors. Processors for carpet are paid to accept the material and separate the carpet into padding, backing, and other materials, which are sold back to industry. More retailers could participate, but the cost of transportation to processors and recyclers is high, while landfill tipping fees are relatively low in Montana, making it difficult for recycling to be an economic alternative. Additionally, consumer trends in homebuilding and renovation appear to be shifting towards other flooring options, making it difficult to estimate future markets.

Construction and Demolition Waste (C&D)

Construction and demolition (C&D) waste consists of the waste generated during construction, renovation, and demolition projects. C&D waste often contains bulky and heavy materials, including concrete, wood, asphalt, gypsum, metal, brick, and plastic, as well as salvaged building components such as doors, windows, and plumbing fixtures. Demolition and renovation represents most C&D waste — approximately 90%, with the remaining 10% generated by new construction. EPA estimates that the commercial and residential building sectors produce 61% and 39% of C&D waste, respectively (https://www.epa.gov/smm/sustainable-management-construction-and-demolition-materials).

In the U.S., estimated C&D debris generated during demolition of a single-family house is 111 pounds per square foot of dwelling. While most of the debris from new construction is wood, most demolition debris is concrete.

C&D Debris Generation by Material and Activity (million tons)

	Waste During Construction	Demolition Debris	Total C&D Debris
Concrete	23.1	358.7	381.8
Wood Products	2.8	36.1	38.9
Drywall and Plasters	2.5	10.5	13.0
Steel	0	4.5	4.5
Brick & Clay Tile	0.3	11.9	12.2
Asphalt Shingles	0.9	12.6	13.5
Asphalt Concrete	0	83.9	83.9
Total	**29.6**	**505.1**	**547.8**

Figure 2: Advancing Sustainable Materials Management: 2015 Fact Sheet

Management

It is uncertain how much of Montana's C&D debris is disposed of with municipal solid waste. Significant quantities of building material, particularly renovation scraps, are discarded in the municipal waste stream. C&D waste can be discarded in Class II or IV landfills, and although Montana has two licensed Class IV C&D landfills in operation, most C&D waste is discarded at Class II landfills. Operators may separate C&D waste from the rest of the waste stream, but they are not required to do so.

Non-friable asbestos waste such as cement asbestos siding, floor tile, linoleum, and asphalt roofing, can be disposed of as construction demolition waste if it remains intact. Non-friable asbestos waste should not be compacted or treated using waste minimization techniques. Additional information on asbestos waste can be found in the next section.

Environmental Issues

Demolition debris may contain hazardous components. Lead is present in solder, flashing, and some old paint. Treated wood contains chromium, copper, arsenic, mercury, barium, and cadmium. Drywall and plaster consist of gypsum, which contains high levels of sulfate. Asphalt, roofing tar, and tarpaper contain leachable petroleum products. All these products are commonly found in C&D waste and have the potential to contaminate the water supply if disposed of improperly. In properly sited, designed, and operated landfills, C&D waste likely does not pose a significant threat to ground water. DEQ interprets the solid waste laws to prohibit unlicensed on-site disposal of C&D waste on private land.

Economic Issues

The most significant contributing factor in the amount of C&D waste that ends up in landfills is the high cost of material separation. Time and space to separate the wastes, the lack of demand for the materials, and the ease/low cost of landfilling are all deterrents to recycling and reuse.

There are potential cost savings for recycling and reuse, however. Overall project expenses can be reduced through avoided purchase and disposal costs, and on-site reuse can reduce transportation costs. Additionally, there is a tax benefit to donating recovered materials to qualified 501(c)(3) charities.

Asbestos Waste

State rules and federal asbestos regulations specifically exempt most residential dwellings from asbestos rule applicability but do require that Regulated Asbestos-Containing Material (RACM) be removed from public and commercial buildings prior to demolition. The impact or removal of RACM during demolition or renovation activities in public and commercial buildings is strictly regulated. RACM is defined in Montana Asbestos rules and EPA regulations as materials that contain more than 1% asbestos and are either classified as friable or may become friable during demolition or renovation activities. Friable means that the asbestos can be crumbled or reduced to powder by hand pressure. Montana Solid Waste rules identifies asbestos contaminated wastes as any waste material impacted by asbestos.

Management

Before demolition or renovation of a public or commercial building, a trained and DEQ-accredited asbestos inspector must conduct an asbestos inspection. Title 40, part 61, subpart M, of the Code of Federal Regulations (CFR) is the asbestos National Emission Standards for Hazardous Air Pollutants (NESHAP) regulation. This regulation, together with ARM 17.74.3-4, governs building demolitions, renovations, active and inactive asbestos landfills, and other sources of asbestos emissions.

An asbestos abatement project permit from DEQ is required if ten or more square feet, or three or more linear or cubic feet of friable or potentially friable ACMs are abated, transported, or disposed of. Only trained and accredited asbestos abatement contractors can perform asbestos activities or handle RACM. RACM can be disposed of only at state-licensed Class II or IV landfills and is regulated under both the ARM and NESHAP regulations.

Disposal site operators are required to provide information on how they will comply with asbestos waste disposal standards during the licensing process. Information includes a description of the waste disposal site, a description of the method to be used to comply with the asbestos NESHAP if warranted, and methods to be used to prevent asbestos emissions. Disposal site operators are also required to retain copies of the waste shipment record (WSR) which must accompany the waste from generator to disposal site and to document specific cells where waste has been deposited.

Environmental Issues

Since the early 1970s, EPA and OSHA have been concerned about the potential health hazards relating to the generation, handling, and disposal of asbestos waste. Serious respiratory diseases and cancers, such as asbestosis and mesothelioma, can appear several years or even decades after asbestos inhalation exposure. Renovation and demolition of asbestos-containing properties pose significant health hazards to construction, transportation, and waste disposal workers as well as persons who might be exposed in their home or workplace.

Economic Issues

The removal and disposal of asbestos-containing materials from public and commercial properties may involve the services of numerous specialties at significant cost. Handling, transportation, and disposal of RACM must be performed in accordance with federal, state, and local rules and regulations.

Electronic Waste

E- Waste

Innovations in technology have led to increased use of electronics, which in turn has increased e-waste being generated when the electronic products reach the end of their useful life. E-waste includes phones, computers, business equipment, entertainment and communications equipment, and thousands of other products used in homes and businesses today. E-waste contains plastic, toxic chemicals, heavy and rare earth metals, and can contribute to pollution if not properly managed.

Montana successfully diverted nearly 1 million pounds of e-waste from waste streams in 2017. This equates to a statewide collection rate averaging one pound per capita. Global E-Waste Monitor 2017 reports 49.2 million tons of e-waste was generated in 2016, an increase of 3.3 tons, or 8%, from 2014. E-waste generated globally is projected to grow at about 3-4% per year, reaching more than 57.5 million tons by 2021.

Manufacturers of mobile devices already offer direct recycling exchange programs for customers. E-waste value depends largely on disassembly labor, material separation, and downstream efficiency.

Management

The number of unwanted electronics generated by the desire or need for technical upgrades is growing, and there is a good reuse market for these products. For example, markets for used cell phones are very strong, offering fundraising opportunities for Montana schools and other organizations. Cellular telephone companies gladly accept back any scrap cell phone, regardless of the brand.

Due to the rare earth metals, gold, and other recoverable metals found within most products, recycling opportunities for e-waste have grown substantially. Even products such as televisions and computer monitors, which contain fewer valuable metals, can be recycled. Many electronics can be recycled for free or for very little cost, but other equipment carries a recycling fee. Electronic recycling is one of the fastest areas of growth within the scrap recovery industry.

There are no processors of e-waste in Montana, but several recycling businesses collect, consolidate, and prepare e-waste for shipment to processors elsewhere. These e-waste “recyclers” are licensed by DEQ as solid waste systems. DEQ began to partner with communities in 2006 to organize electronics collection events. Several communities now offer events annually or have started permanent collection programs. Montana citizens have recycled nearly 3 million pounds of e-waste since 2006. EPA estimates that electronics make up nearly 2% of the municipal waste stream and the volume of electronics in the waste stream will greatly increase as personal electronic use continues to expand. EPA estimates that more than 80% of electronics are disposed of in landfills across the U.S. Most of the electronic waste in Montana is landfilled, partly because access to e-waste recycling is limited to annual events, and because access to retail programs may require transporting the e-waste long distances to stores. A handful of municipal and private solid waste companies offer year-round recycling opportunities (http://www.epa.gov/waste/conserve/materials/ecycling/index.htm).

Environmental Issues

Although small amounts of heavy metals may be used in each electronic product, the volume of e-waste in landfills raises concerns about potential leaching and cumulative effects. Mercury, lead, cadmium, and PCBs can leach when circuit breakers, cathode ray tubes, and monitors are exposed to acidic water, as can happen in landfills. EPA states that 80% of the recycling operations in the U.S. operate within the confines of national and international laws regarding the shipment of hazardous waste. As a regulator of the e-waste industry, EPA has issued enforcement actions and fines to a small number of e-waste recyclers caught in violation of federal law

and international laws and treaties. Working with industry watchdogs and trade organizations, EPA is addressing the illegal export of e-waste to countries with primitive recycling practices and lax environmental protections.

Economic Issues

The electronics recycling industry has been growing rapidly, and companies are now merging and consolidating operations, as well as developing methods of recycling hard-to-handle materials (e.g., cathode ray tubes that were used in older televisions and monitors). These activities are expected to lower recycling service fees but may not eliminate them. Import bans may also slow the recycling rates as more countries that the U.S. has traditionally sent e-waste to are strengthening their environmental regulations.

Waste Batteries

Batteries convert chemical energy to electrical energy to power electronic equipment, and their chemistry differs according to the purpose and use of the battery. Batteries are divided into three main categories: lead-acid automobile batteries, non-automotive lead-based batteries, and dry-cell batteries. Dry-cell batteries are further divided into three categories: alkaline, button-cell, and rechargeable. As small, portable electronic items increasingly become part of everyday life, dry-cell battery usage continues to increase, along with public interest in recycling of all batteries, regardless of chemistry. EPA estimates that nearly 3 billion household dry-cell batteries are purchased in the United States each year, along with 99 million wet-cell lead-acid car batteries and an unknown number of heavy-duty batteries for industrial applications (http://www.epa.gov/waste/hazard/wastetypes/universal/batteries.htm).

Management

Automotive batteries contain lead and sulfuric acid, which warrant the designation of hazardous waste when disposed. Fortunately, lead has inherent value and is recyclable. In the U.S., over 95% of all automotive batteries are recovered and recycled. Virtually any place that sells car batteries will accept used ones in trade. Commercial demand for the lead drives private sector interest in collecting and recycling these battery types. The chemistry of dry-cell batteries ranges from those with no recovery value (household batteries) to rechargeable batteries for which a recycling program is federally required.

There is no federal requirement for alkaline battery recycling and only limited programs are available. The available programs charge handling and processing fees to offset the costs of collection and recycling household batteries.

The chemistry of rechargeable batteries requires more toxic materials than alkaline batteries and a federal law requires manufacturers of rechargeable batteries to provide a program for collecting and recycling their products. The intent of the law is to recover the heavy metals and reduce potential pollution at disposal. The Call2Recycle program (formerly the Rechargeable Battery Recycling Corporation) is an industry-funded non-profit organization that offers free recycling of all rechargeable batteries that weigh less than 11 lbs. (www.call2recycle.org). Postage-paid collection boxes are provided at no charge to retailers, public agencies, and other interested parties. Many home improvement stores, electronics, and battery retailers participate in this program and provide drop-off locations for consumers. Consumers can visit www.Earth911.org to find the nearest collection center.

Source reduction for batteries occurs at the point of purchase, where businesses, government agencies, and consumers can choose to purchase rechargeable batteries rather than disposable alkaline batteries. Purchasing rechargeable batteries reduces the need for replacement of alkaline batteries, and the Call2Recycle program

provides convenient recycling opportunities. For this reason, DEQ promotes the purchase of rechargeable batteries over alkaline batteries.

Environmental Issues

Although the chemistry of household batteries has changed to contain fewer heavy metals and almost no mercury, public perception has not changed. Household alkaline batteries can be safely disposed of in landfills, but DEQ receives many requests for household battery recycling programs. Because battery manufacturers started phasing out the use of mercury in alkaline batteries in 1989, the dry-cell battery types that continue to require it are now made with much less mercury than in the past. Research continues into alternatives that would allow reduced use of heavy metals in other battery types.

Rechargeable batteries are of more concern, however, due to significant amounts of cadmium, copper, zinc, lead, manganese, nickel, and lithium. These heavy metals may create a hazard to human health when disposed of incorrectly. In landfills, heavy metals have the potential to leach slowly into soil, ground water, and surface water, aided by the corrosive activity of the battery electrolyte.

Additionally, primary lithium batteries become hazardous when the outer casing is damaged and the contents are exposed. If improperly discarded or mishandled with machinery, the batteries can explode or combust, causing harm or fire within the landfill, which can burn for long periods and are very difficult to extinguish.

Economic Issues

All batteries can be recycled to some extent, but collection and processing costs, in addition to federal law, often determine whether recycling programs exist. Alkaline battery recycling programs are rarely established because of associated costs. The Call2Recycle free collection and recycling program for rechargeable batteries exists due to federal requirements on manufacturing. Rechargeable batteries cost more initially, but DEQ promotes the purchase of rechargeable batteries over disposable batteries because of the available recycling programs.

Pharmaceutical Waste

Pharmaceutical waste encompasses discarded prescription and over-the-counter therapeutic drugs, veterinary drugs, diagnostic agents, and supplements such as vitamins. The pharmaceutical industry estimates 3% of the prescriptions written in the U.S. are filled but never used. The preferred disposal option for these prescriptions is through take-back programs when available.

Management

The Montana Department of Justice (DOJ) launched Operation Medicine Cabinet in 2010 to assist local law enforcement agencies in establishing permanent prescription drug drop-off locations. Though developed primarily to prevent illegal use of prescription drugs, this program has the added advantage of ensuring proper disposal of pharmaceutical waste. Several Montana communities have established permanent drop-off locations. See https://dojmt.gov/consumer/prescriptiondrugabuse/ for more information on the DOJ program.

When a take-back program is not available, the preferred method of disposal is to place medication in a sealed container and place into the landfill. These products should never be flushed into sewer or septic systems.

Environmental Issues

The two greatest concerns related to improper disposal of pharmaceutical waste are hormone disruption in fish and other animals, and bacteria that can become resistant to antibiotics. Many contaminates are currently

unregulated. The Safe Drinking Water Act (SWDA) requires EPA to publish the Contaminate Candidate List (CCL) every five years. The SDWA directs the EPA to consider the health effects and occurrence information for unregulated contaminants as the EPA makes decisions to place contaminants on the list. SDWA further specifies that the EPA place contaminants on the list that present the greatest public health concern related to exposure from drinking water. EPA uses the CCL to identify priority contaminants for regulatory decision making and information collection (www.epa.gov/ogwdw/ccl/indix.html). The National Toxicology Program is also researching the effects on human health of low-dose exposure to pharmaceuticals in drinking water.

Economic Issues

Drug take-back programs require money for collection and processing. The programs rely on donations or grants and may not be sustainable.

Animal Waste (tissue/offal)

Animal waste is primarily derived from the agricultural sector (e.g., farms, ranches, and livestock holding areas), but can also include roadkill, wild game, and animals from managed game farms. Animal waste includes whole or parts of carcasses from butchering and veterinary medical procedures.

Montana landfills need to carefully dispose of animal waste, as well as be prepared to handle a contamination incident should it occur. In the event of an outbreak of a highly contagious animal disease, special measures must be taken to ensure the disease agent is eradicated, and to contain the outbreak and prevent its reoccurrence. In some cases, the agent will not survive long after the death of the infected organism, and proper burial of the carcass is sufficient. Other diseases require incineration to be eradicated. Determination of the correct option is addressed on a case-by-case basis by state agencies. It is the owner's responsibility to properly dispose of diseased animals.

Management

Animals found on public roadways are handled by the Montana Department of Transportation (DOT), which usually removes the carcasses and takes them to maintenance facilities to be composted. Animal carcasses found in the wild can typically be left to naturally decompose, unless they appear to have died from a threatening disease. In that case, the animal should be reported to the Montana Department of Fish, Wildlife and Parks (FWP).

Entrails and other organic remnants from hunting can typically be disposed of with regular household waste, while hides can often be sold to "hide and fur" locations throughout the state. An animal corpse can also be disposed of on private property with the consent of the owner if disposal meets requirements and restrictions in Section 75-10-213, MCA.

DEQ regulates some aspects of the disposal of dead animals under Sections 75-10-212 and 213, MCA, and provides guidelines for proper burial of animals. For animals that did not die from a contagious disease, the primary disposal method is to bury them in a high and dry location to protect surface and ground waters. Animals buried must be covered with a minimum of two feet of soil. The Montana Department of Livestock provides guidelines for the disposal of animals from agricultural operations.

Environmental Issues

There are two primary concerns with disposal of animal waste: the effect it may have on water quality in the process of natural decomposition, and the potential of spreading disease. Anthrax, foot and mouth disease,

chronic wasting disease (CWD), and bovine spongiform encephalopathy are just a few of the diseases that could be spread by inadequate disposal of sick animals.

Economic Issues

Rendering plants are the main source for recycling dead animals, slaughterhouse wastes, and supermarket waste into various products known as recycled meat, bone meal, and animal fat. These products are sold as a source of protein and other nutrients. Currently, there is no rendering plant in Montana.

In Montana, livestock continues to graze on public and private lands, and dairy and other animal products are produced across the state. Hunting draws a large group of visitors to the state each year. Successful animal-related industries are therefore vital to the economy and environment of the state.

Yard & Food Waste (Organics)

The EPA estimates that roughly 31% of the domestic food supply is wasted, with nearly 38 million tons being disposed in the U.S. every year. Yard trimming contribute an additional 34.5 million tons to the waste stream.

Food waste includes food that has spoiled; uneaten prepared food; fats, oils, and grease used to cook food; and by-products of the food and beverage manufacturing considered unfit for human consumption. Food waste comes from the following sources:

- Single and multi-family residences
- Foodservice establishments (restaurants, cafeterias, etc.)
- Institutions (universities, prisons, hospitals, etc.)
- Grocery stores
- Hospitality and entertainment venues (hotels, stadiums, etc.)
- Food processing and manufacturing industries
- Agriculture

Yard waste includes grass clippings, woody debris, and other plant materials such as weeds, which come from residential and commercial landscaping. Woody debris may also come from natural events such as high winds and wildfire.

Management

Together with paper and paperboard, organic materials make up the majority of MSW generation. The most common method of disposal for food waste has been landfill or incineration.

Yard trimmings are often composted on-site in landfills and account for around 23% of total recycling in 2014 nationwide. However, only 5.1% of food waste was diverted from landfills and incineration.

The EPA estimates that more food reaches landfills and incinerators than any other single material in everyday trash, constituting 21.6% of discarded municipal solid waste in 2014. In 2010, the U.S. Department of Agriculture (USDA) estimates that 31% of the food produced in the U.S. was not available for human consumption at the retail and consumer levels. The Food and Agriculture Organization of the United Nations (FAO) estimated that approximately one-third of all food produced worldwide was lost or wasted in 2011.

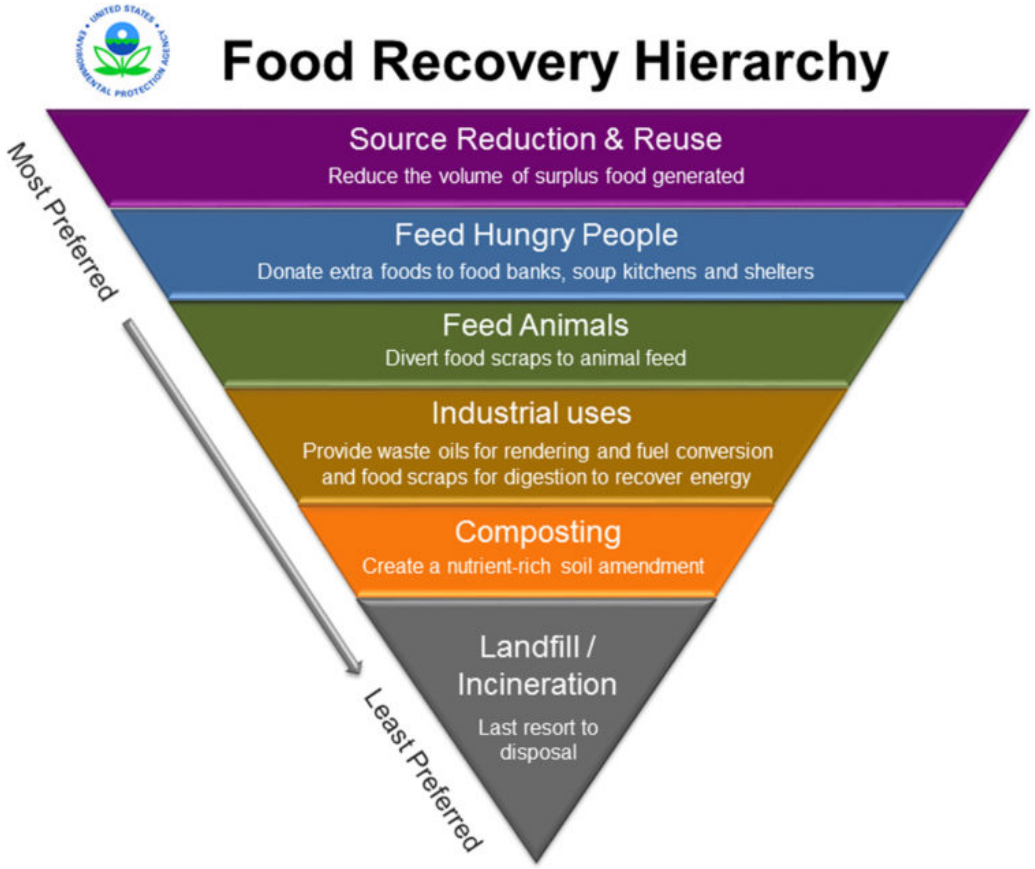

Figure 3: Advancing Sustainable Materials Management: 2014 Fact Sheet

The above EPA hierarchy shows food recovery methods ranked from most to least preferable. Reduction of food waste is the preferred option.

Many non-perishable and unspoiled perishable foods can be donated to organizations to feed hungry people if they are managed properly. Corporate donors are protected from liability under the Bill Emerson Good Samaritan Food Donation Act, as long as the donor has not acted with negligence or intentional misconduct. There are also potential tax benefits for companies that donate food.

If donating food to feed people is not an option, the next preferred management strategy is feeding livestock and other animals with the waste. MCA 81-2 Part 5 details the Montana regulations for feeding food waste to swine. Montana allows the feeding of animal-derived waste to swine if it has been properly heat-treated and fed by a licensed facility. All other waste may be fed to swine without heat-treatment. Individuals may feed household garbage to their own swine without heat-treating and without a permit: “Garbage fed to swine must be heated to a temperature of 212 degrees Fahrenheit for at least 30 minutes or treated in some other manner approved by the department of agriculture” MCA 81-2-509.Industrial uses for organic wastes includes anaerobic digestion, rendering, and the conversion to biodiesel fuel.

Anaerobic digestion is a process where microorganisms break down organic materials, such as food scraps, manure, and sewage sludge in the absence of oxygen. Recycling wasted food through anaerobic digestion produces biogas and a soil amendment, two valuable products. Food waste can be processed at facilities specifically designed to digest the organic portion of municipal solid waste. It can also be co-digested at wastewater treatment plants and manure digesters. Liquid fats and solid meat products can be used as raw materials in the rendering industry, which converts them into animal food, cosmetics, soap, and other products. However, there are no rendering facilities in Montana.

Biodiesel is a renewable fuel produced from agricultural resources such as vegetable oils. Most biodiesel is made from soybean oil, but canola oil, sunflower oil, recycled cooking oils, food waste, and animal fats are also used. In Montana, biodiesel production facilities that produce biodiesel from waste cooking oil, and who produce more than 2,500-gallons of biodiesel per year must obtain a Class II Solid Waste Management System license. Biodiesel production facilities that produce biodiesel from waste cooking oil and who produce less than 2,500 gallons per year for personal use must obtain a Small Biodiesel Production Facility license. The license is free and is renewed annually.

Compost is created by combining organic wastes in the correct ratios into piles, rows, or vessels. Mature compost is created using high temperatures that destroy pathogens and seeds from weeds that natural decomposition does not destroy. A free license is available in Montana to compost operations that meet the definition of a Minor Compost Facility, which is a composting operation that:

- Has less than two acres of active working area;
- Accepts less than 5,000 cubic yards of feedstock annually;
- Produces less than 2,500 cubic yards of compost annually; and
- Does not accept sewage sludge, biosolids, or septage.

A Major Compost Facility is a composting operation that does not meet the definition of Minor Compost Facility. Facilities that accept sewage sludge, biosolids, or septage for composting are major composters. They are subject to an application and licensing fee.

While residential and commercial food waste collection services are available in urban areas, including Missoula and Bozeman, it is not available state-wide. Households can compost food and yard waste at home, but should be mindful of proper composting methods to avoid odor and wildlife issues.

Environmental Issues

The major environmental issue with organic waste in landfills is the production of methane, which contributes 18% of the total methane produced in the U.S. Reducing food waste, reusing food for humans and animals, and repurposing it through industrial uses and composting can help mitigate methane emissions in Montana landfills.

Pollution related to food production can be lessened by reducing the amount of food wasted, which also saves energy associated with growing, preparing, and transporting food. Using composted food and yard waste can improve soil health and structure, improve water retention, and reduce the need for fertilizers and pesticides.

In Montana, wildlife can also cause issues with composting in similar ways to landfills and transfer stations. Proper containment should be used in any composting operation.

Economic Issues

Wasted food is wasted money for consumers and businesses; money can be saved buying only what is needed and by avoiding disposal costs. Organizations might pay less for trash pickup by keeping wasted food out of the MSW. Some haulers lower fees if wasted food is separated from the trash and sent to a compost facility instead of the landfill.

Recovering and recycling wasted food through donation, salvaging, processing, industrial reuse, and composting strengthens infrastructure and creates jobs. Food recycling in these sectors employs more than 36,000 people in the U.S., supporting local economies and promoting innovation.

Contaminated Soils

When petroleum products, solvents, or other toxic chemicals leak or spill onto soils, action must be taken to prevent the migration of the contaminants into ground and surface water. Contaminated soils that are not hazardous may be treated *in situ* (at the spill location) depending on the level of contamination, or by removal to a landfarm or a Class II landfill. Contaminated soils as well as sump solids from vehicle service centers and car washes are regarded as Group II solid waste. These are handled as contaminated soils, provided they are not listed as characteristic hazardous waste under RCRA. Soils from an automated car wash or an attended car wash that prohibits use of chlorinated solvents and remain visually free of grease and oil are not considered solid waste (ARM 17.50.814). If contaminated soils are determined to be hazardous, they are regulated under hazardous waste rules. Waste managers must ensure environmentally sound treatment and disposal.

Management

In 2011, six facilities in Montana were licensed as soil treatment facilities, and five Class II Landfills were licensed to include soil treatment facilities. Contaminated soils are typically landfarmed on-site in Montana, or taken to a licensed facility. Numerous sites may have been licensed as "one-time" landfarms for *in situ* remediation.

Environmental Issues

While treatment and disposal methods may provide greater protection than leaving the soils untreated on-site, they raise some environmental concerns. Depositing large amounts of petroleum-contaminated soil in a landfill takes up valuable space and introduces contaminants that may eventually leach from the landfill. Landfarming also releases volatile organic chemicals into the air, which may be of concern to surrounding residents.

Petroleum products generally contain more than 100 different constituents that possess a wide range of volatility. The volatility of contaminants proposed for treatment by landfarming is important because volatile constituents tend to evaporate, particularly during tilling or plowing operations, rather than being biodegraded by bacteria. In general, gasoline, kerosene, and diesel fuels contain constituents with sufficient volatility to evaporate from a landfarm. Lighter (more volatile) petroleum products such as gasoline tend to be removed by evaporation during landfarm aeration processes. Landfarms must regularly monitor water and soil contaminants as heavy precipitation increases the danger of leachate formation.

Economic Issues

Landfarming is a cost-competitive treatment for contaminated soils, running between $30 and $60 per ton (https://deq.mt.gov/Portals/112/Land/SolidWaste/Documents/docs/LandfarmGuidance.pdf). If contaminated soils are shallow (less than three feet below ground surface), it may be possible to effectively treat the contamination without excavating the soils.

TENORM Waste

Naturally occurring radioactive material (NORM) occurs at low levels in soils and rocks and contains one or more radioactive isotopes, also called radionuclides. These radionuclides are present in geologic formations from which oil and gas are produced and from other sources, such as ground water aquifers that are used for drinking water and in bio-solids derived from wastewater treatment. The material generally consists of the radionuclides uranium and thorium and their daughter products, including radium, specifically Radium 226 and Radium 228. Since radium is present at low levels in the natural environment, everyone has some exposure to it. NORM is found in the air and soil, and even in radioactive potassium in our own bodies. Natural radioactivity is present in common household items. Examples include: bananas 4 picocurie per gram (pCi/gm), brazil nuts 6 pCi/gm, cat litter 5 pCi/gm, coffee 27 pCi/gm, granite countertops 27 pCi/gm, and phosphate fertilizer 123 pCi/gm.

Technologically enhanced naturally occurring radioactive material (TENORM) is in the same group of NORM radionuclides that has been modified or "technologically enhanced". TENORM waste is not nuclear waste or byproduct material defined under the Atomic Energy Act and commonly regulated by the Nuclear Regulatory Commission (NRC).

NORM/TENORM only poses a radiation health risk if inhaled or ingested because the radiation is primarily emitted in the form of alpha particles. Compared to other particles, alpha particles undergoing decay do not have high penetration rates and can be stopped by something as simple as a sheet of paper or skin protecting the human body. Therefore, proper landfilling of NORM/TENORM waste, such as requiring daily cover and other protective measures, poses minimal risk from external exposure.

Management

In Montana, wastes are classified according to their physical and chemical characteristics and the resulting potential of the wastes for causing environmental degradation or public health hazards. This classification determines the degree of care required in handling and disposal. To this point, TENORM wastes have been regulated as Group II wastes and require management at a Class II facility. Class II facilities are designed to include the most protective controls to ensure the continued protection of human health and the environment.

The Montana Department of Environmental Quality (MDEQ) Solid Waste Program:

- Published draft Technologically Enhanced Naturally Occurring Radioactive Materials (TENORM) waste management rules on August 18, 2017;
- Held two public hearings and received valuable comments from the public;
- Extended the initial 60-day public comment period another 30 days due to public interest;
- Has revised the entire rule package to include clarifications, modifications, and technical input based upon comments received during the initial and subsequent public comment periods;
- Organized a TENORM workgroup that met October 16, 2018 to work out relevant details and refine draft TENORM rules before publishing for formal public comment;
- Rule structure will ensure transparency and provide the regulatory framework to protect human health and the environment; and
- Revised TENORM rules are anticipated to be adopted during 2019.

Environmental Issues

At the national level, EPA is working to understand the problems associated with TENORM and to develop effective ways to protect people and the environment from unnecessary exposure to the radiation from these materials. Because TENORM is generated by many industries in varying amounts and occurs in a wide variety of products, the management of TENORM is a complex issue. Management of TENORM waste in the United States is inconsistent from state to state, therefore Montana has decided to draft its own rules regarding this issue.

EPA is investigating TENORM challenges in three ways:

- Studying the TENORM-producing industries to characterize their residuals and wastes, and evaluate potential exposures.
- Identifying and studying TENORM to assemble an understanding of where TENORM wastes are from, what's in them, and the risks they present to people and the environment.
- Working with other organizations that are also confronting the problem, including states, tribes, other federal agencies, industries, environmental groups and international organizations.

Many of the materials that are considered TENORM have only trace amounts of radioactivity and are part of our everyday landscape. However, some TENORM has relatively higher concentrations of radionuclides that can result in elevated exposures to radiation.

Economic Issues

The economic issues are not fully understood at this time since this a relatively new waste management category.

TASK FORCE RECOMMENDED STRATEGIES FOR INCREASING WASTE DIVERSION

(PLAN ELEMENTS DEVELOPED BY TASK FORCE)

Perhaps the most valuable aspects of the IWMP is the strategy section for increasing the yearly solid waste diversion rate through recycling/composting, and developing recommendations for improved handling of "Special Wastes." To compose this chapter, DEQ sought input from an advisory task force composed of representatives from local governments, solid waste and recycling entities, environmental organizations, citizens, and other parties interested in solid waste management. Outcomes from the task force meeting guided the structure of this section. The agenda and notes for the task force can be requested from DEQ's Materials Management Program.

Successes:

There has been some incredible success in Montana over the past five years. The following list is not inclusive of all those successes. These were some of the highlights discussed at the task force meeting on May 8, 2018.

- Recycle Montana has created educational trunks for use in schools. There are currently 8 trunks.
- First graders in Missoula engaged in the civic process to have their municipality to ban straws unless requested and were granted a Straw Free Day in Missoula on the May 4th.
- Sanders County has enacted a voluntary ban on Styrofoam packaging and containers. Commissioners sent out letters to local businesses asking for their support to stop the use of this material in the county.
- Yellowstone National Park has committed to the reduction of plastic in the park. They are working with a Montana company to provide water in aluminum bottles instead of single use plastic bottles. This will

potentially divert a quarter million water bottles from the waste stream. They are also seeking to reduce or compost food waste across the park.
- Helena Recycling is now collecting glass with its curbside recycling. The glass is then taken to Ash Grove cement plant.
- Three bars and concert venues in Missoula have eliminated single use containers to help with the "Zero by Fifty" initiative in Missoula.
- Pacific Steel and Recycling has received third-party accreditation for e-waste and R-2, with some sites offering a 24-hour drop-off bin.
- The community of Eureka has recycled a large portion of its cardboard for the past 10 years.
- There is a growing trend of people wanting to recycle, and even a willingness to pay for these services.

Barriers:

The IWMP Task Force identified the following barriers to sustainable materials management within in their communities and across the state:

- The annual Recycling Survey is voluntary, which leads to incomplete diversion data. Without accurate reporting, diversion rates cannot be correctly used to see if the state has reached its diversion goals.
- Lack of public education — where to recycle, how to recycle, effects of product contamination, and the realization that recycling is not free.
- China Shutdown – many materials are not currently being collected since there is nowhere to send them.
- Transportation costs — substantive quantity of commodity is needed to pay the cost of shipment to markets.
- The closure of AWARE in Butte and Helena Industries in Helena, two non-profits that provided an outlet for goods to be reused/repurposed as well as e-waste collection and recycling, has reduced the opportunities of people in those communities to divert certain waste streams.
- DEQ Solid Waste HHW event licenses – requiring a license for individual event often puts a burden on coordinators by necessitating redundant licenses for collection sites, haulers, and events.

Common Opportunities:

- Public support — interest in recycling and composting is very high.
- Public mindset — the disposable nature of consumerism is being scrutinized by community members.
- Community Events — recycling drives are popular and successful.

Task Force Recommendations:

The IWMP is updated every 5 years according to statue, but the department should gather available stakeholders for a task force meeting more often. This meeting should rotate around the state for better involvement with county and private organizations.

- Integrate recycling into the Solid Waste Advisory Committee meetings.
- Present pound per person per day diversion and waste statistics to compare with national averages.
- Move composting initiatives higher on DEQ's priority list.
- Create an on-line market exchange similar to Craigslist.

Additional Task Force Ideas and Comments:

- Research how other states are successfully addressing C & D waste. What are their formulas and best practices?
- Research what other states are doing about producer responsibilities related to paint, laptops, carpeting and other toxic wastes.
- Research which states have higher diversion rates than Montana and how they achieve those results.

- Consider breaking down diversion rates further, by county or region, to show where more energy should be used on education and outreach.

IMPLEMENTATION APPROACHES FOR INCREASING WASTE DIVERSION

(DEQ Response to Task Force Recommendations)

State and local governments, universities, K-12 schools, businesses, and citizens of Montana must continue to develop and improve partnerships to increase recycling/diversion of solid waste. The last goal set by the legislature was a diversion rate of 22 percent by 2015. The state achieved this number in 2014, but fell short in 2015. Because the recycling reporting surveys are voluntary, it is hard to get an accurate percentage showing the state's diversion rate. The materials management program (MMP) believes that the amounts are underreported, and the 22% diversion rate is being reached or exceeded.

Moving forward the MMP will continue using the 2015 measurement of 22% until the legislature establishes new timelines and goals for diversion.

DEQ will utilize the common strategies recommended by the Task Force to build upon past successes and to build momentum at local and state levels. Education and outreach will continue to be the foundation of the MMP's efforts over the next five years as will be working with community and business partners and supporting stakeholder efforts.

An issue discussed at the Task Force meeting was that this group is brought together only once every five years. It may be in the best interest for the MMP, NGO's and private businesses to have more frequent conversations about the recycling markets and trends. More public input from around the state will help the MMP gauge where our efforts are best used to increase diversion. We will attempt to have more frequent meetings and move the location around the state, to maximize attendance from all areas.

ACKNOWLEDGEMENTS

The Solid Waste Section of the Department of Environmental Quality wishes to acknowledge the guidance and assistance of the Integrated Waste Management Plan (IWMP) Task Force. Members included local government officials, citizens, solid waste and recycling industries, environmental groups, and others involved in the management of solid waste. IWMP task force members worked with DEQ to define goals, develop recommendations, and review preliminary drafts of the document.

Special thanks to Beki Brandborg for facilitating the task force meeting.

IWMP Task Force members include:

NAME	COMPANY/FACILITY	REPRESENTING
Leaf Magnuson	US Forest Service	Federal Government
John Hilton	Helena Recycling LLC	Private Business
Jennifer Battles	AERO	Environmental Organization
Matt Elsaesser	406 Recycling	Private Business
Barb Butler	Billings Landfill	Public Landfills
Larry Laknar	Beaverhead County	Public Landfills
Ryan Green	Happy Trashcan Composting	Small Composter Operations
Dylan Hoffman*	Xanterra Resorts – Yellowstone	Private Business
Cathy Conlin*	Sanders County	Local Government
Jeremy Drake	Home ReSource	Nonprofit Organization
Elaine Taylor	Montana Beverage Association	Trade Association
Kirby Farner	Pacific Steel	Private Business
Rick Farrow	Pacific Steel	Private Business
Chase Jones	City of Missoula	Local Government
Mark Nelson	Lake County	Municipal Transfer Station
Dianna Robinson	Solid Waste Section	Montana DEQ
Brady Christensen	Solid Waste Section	Montana DEQ
Dusti Johnson	Solid Waste Section	Montana DEQ
Rick Thompson	Solid Waste Section	Montana DEQ
Ed Thamke	WUTMB	Montana DEQ
John Podolinsky	Small Business Ombudsman	Montana DEQ

* Attended via conference call

PUBLIC COMMENT SUMMARY