

Solid Waste Management for Rural Alaska

Operational Guidance
Version 3.0

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Solid Waste Program

Alaska Department of Environmental Conservation
Division of Environmental Health

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Abbreviations and Acronyms

AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
C&D	Construction & Demolition
CFCs	Chlorofluorocarbons (Freon)
EPA	Environmental Protection Agency
HHW	Household Hazardous Waste
IGAP	Indian General Assistance Program
PCBs	Polychlorinated biphenyls
PPE	Personal Protective Equipment
RALA	Rural Alaska Landfill Administrator training
RALO	Rural Alaska Landfill Operator training
VOCs	Volatile Organic Compounds

Glossary

18 AAC 60: Alaska's Solid Waste Management regulations.

Area Fill Landfill: A landfill in which waste is disposed of at or above ground level.

Alternative Cover: Material used as landfill cover other than soil, sand, or gravel when those materials are not available. The material must be approved by ADEC.

Asbestos: A material made from a fibrous mineral that is known to cause lung disease.

Backhaul: sending waste materials out of the community that are hazardous or can be recycled. Term originated from planes or containers that arrived full of products to a rural community, that were utilized to haul back out materials that were going to be recycled or were not appropriate for local disposal. This practice of preventing containers or planes from leaving empty became the basis for the use of the term backhauling in rural Alaska.

Balefill: An area fill that receives waste processed through a baler machine.

Baler: A machine that compacts trash into bales (blocks of waste). This machine may also band or bag the bales of waste.

Cell: A specific area within the landfill designated for waste disposal.

Class III Landfill: A municipal solid waste landfill that accepts less than 5 tons of municipal solid waste for disposal per day, or less than 1 ton per day of ash from incinerated (burned) municipal waste.

Construction & Demolition Debris: The waste generated from the alteration, construction, destruction, rehabilitation, or repair of any manmade physical structure including houses, buildings, schools, commercial facilities, community water tanks, and water or sewer systems.

Daily Cover: Six (6) inches of compacted soil applied to the working face at the end of each working day.

Disease Vector: Something that can carry disease-causing pathogens from one location to another. This can include people, insects, rodents, dogs, birds, bears, foxes, etc.

Erosion: The wearing away of land or soil materials by the action of wind and/or water.

Final Cover: Two (2) feet of compacted soil material applied to disposal cells that will no longer receive waste.

Groundwater: Water below the ground surface in the zone of saturation.

Intermediate Cover: Twelve (12) inches of compacted soil applied to disposal cells that will not receive waste for 90 days or more.

Leachate: Contaminated liquid that is created when water flows from, through, or otherwise comes into contact with solid waste. Generally observed as discolored water flowing out of the

landfill or ponding in the landfill.

Medical Waste: Any syringes/needles/sharps, blood or bodily fluids, or other potentially infectious material.

Municipal Solid Waste: More commonly known as household trash or garbage – consists of everyday items we use then throw away.

Polluted Soil: Soil that is placed into a landfill, that is not a regulated hazardous waste, and that was excavated during a spill response or leaking underground storage tank action or to comply with an approved contaminated site cleanup plan under 18 AAC 75 or 18 AAC 78; OR a residue or other material that is placed into a landfill and that is not a regulated hazardous waste but contains a hazardous substance in a concentration exceeding the applicable soil cleanup levels set out in 18 AAC 75.341, Table B1 or Table B2.

Putrescible: Solid waste that contains organic material capable of decomposing.

Trench-and-fill Landfill: A landfill in which waste is placed in a trench or other excavated area and buried.

Wetlands: A lowland area, such as a marsh or swamp, which is saturated with moisture.

White Goods: Household appliances such as refrigerators, chest freezers, stoves, air conditioners, and washing machines.

Working Face: The part of the landfill where waste is actively placed for disposal.

Zone of Saturation: The area below the ground surface in which all the pores and rock fractures are filled with water.

Introduction

The **Solid Waste Management for Rural Alaska Operational Guidance** was developed by the Solid Waste Program to provide guidance for better managing solid waste in rural Alaska.

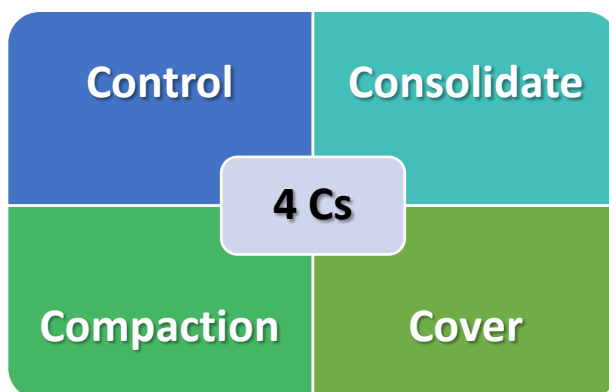
The information included in this guidance is focused on improving waste management in communities with Class III landfills. Waste management in small and remote communities has very specific challenges and it is important that these challenges are addressed. This document is intended to help community leaders and landfill operators tackle those challenges by explaining how best to ensure that solid waste is handled and disposed of in a manner that minimizes impacts to human health and the environment. These practices are commonly referred to as Best Management Practices.

While this guidance has been developed for remote communities, it only provides general advice. Each community's needs and circumstances are unique and site-specific. The Rural Landfill Specialists at ADEC can provide communities with additional information to help with those site-specific needs.

The 4 Cs

Access Control, Consolidation, Compaction, and Cover (known as the 4 Cs) are the basics of operating a landfill. ADEC believes these four elements are the foundation to proper landfill management. Without a comprehensive understanding and implementation of these basic operations, the overall cost of maintaining a landfill will be higher and the landfill's negative impact on human health and the environment can be greater.

Focusing on the 4 Cs is a great way to start learning about waste management improvement techniques. Throughout this manual, this graphic will appear in sections that either play a role in supporting one of the 4 Cs or is one of the 4 Cs itself. For example, the use of signs can support landfill control and consolidation.



1.0 Landfill Site Control

1.1 Landfill Road Maintenance

Landfill access and on-site roads under the operator's control must be kept passable and safe for vehicles during normal hours of operation. (18 AAC 60.220)

The road or boardwalk to the landfill must be accessible year-round to prevent waste from being stored within the community or illegally dumped. It should be designed to accommodate the anticipated vehicle types and traffic in all seasons.

Roads or boardwalks leading to the landfill and within the landfill itself should be clear and maintained so that they are drivable at all times. In addition to snow removal, waste should also be removed and kept off the road, roadside, boardwalk, and boardwalk edges. Post signs along the road to the landfill to direct users to take waste all the way into the facility. Keeping the road or boardwalk free of litter can also help encourage people to take their waste to the landfill instead of dumping it along the landfill road.



Waste free road at landfill entrance



Road to the landfill. Photo Credit: Peter Olson, Golovin Public Works Director

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Helpful tips for road maintenance:

Plowing snow in the winter, even if snowmachines are the only traffic, often leaves the road in better condition during spring breakup with fewer potholes in the summer.

Don't forget to include the landfill road during spring cleanup and pick up any windblown trash that has escaped the landfill during the winter.

Roads inside the landfill should be well maintained. If people are afraid of damaging their tires, they will not take their waste inside the landfill.

Routine road maintenance can help prevent problems that occur every year such as washouts, flooding, ruts, etc.

Using a river instead of a road or boardwalk to access the landfill?

The river *is* the access road for some communities and needs to be maintained and kept litter free. One way to help keep the river free of litter and waste is to have collection bins with lids along the river, especially close to town and at the unloading dock/area at the landfill. Without these bins, waste can pile up on frozen riverbanks and will end up in the river after spring thaw. Keeping the riverbanks and river clean protects the community's drinking water and subsistence resources.



Waste collection bins for a landfill on the river. These bins are emptied by the operator in the winter preventing the buildup of waste on the riverbank from residents disposing of waste from their boats. These bins should be covered to prevent litter and water infiltration.

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Examples:



Litter free, well-maintained landfill road.

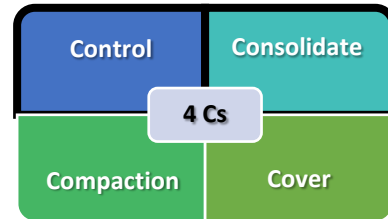


Well-maintained road within the landfill.

1.2 Signage

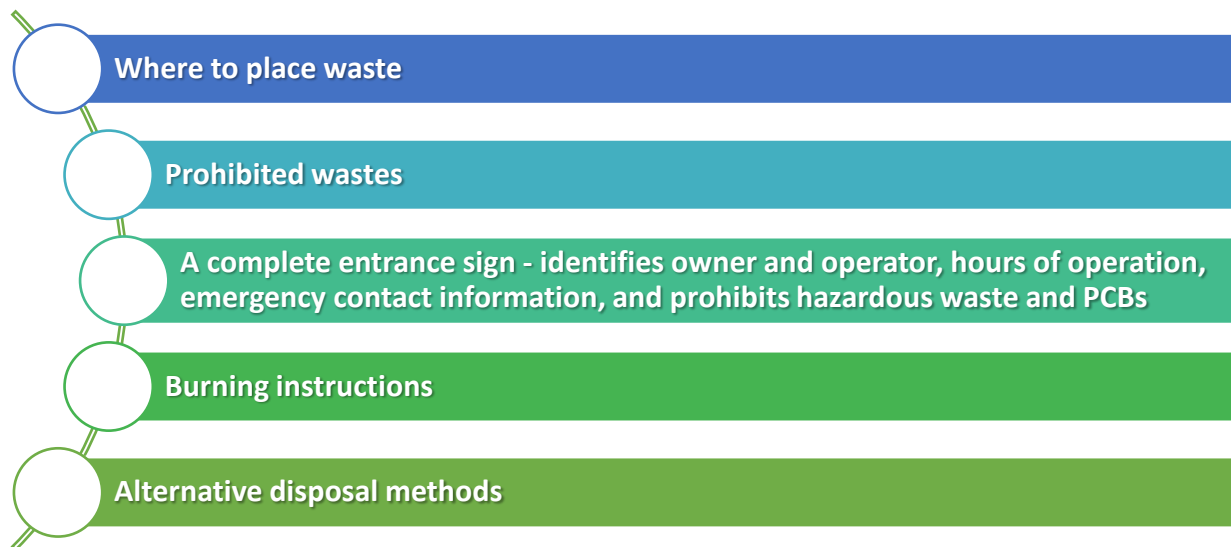
A clearly legible sign must be posted at the entrance to the landfill to notify users that the disposal of regulated hazardous waste and polychlorinated biphenyl (PCB) waste is prohibited. (18 AAC 60.240)

Signs are necessary to direct landfill users both inside and outside of the landfill for proper waste segregation and disposal.



Best Practices for Signs

A successful landfill will have signs with detailed information on:



Signs help keep the landfill organized, prevent the dumping of hazardous wastes at the landfill, and prevent non-burnable wastes from being burned.

If a waste is prohibited from the landfill, it is important to also let people know what to do with that waste instead of simply telling them that the landfill will not accept it. For example, if the landfill prohibits used oil but the local shop accepts it, consider the use of signs or flyers to advertise that used oil should be taken to the local shop instead of the landfill. If people are not informed about what to do with prohibited waste, it will often be illegally dumped somewhere.

Cost and Repurposing

- Purchasing signs can be expensive, but these signs are often durable and require little maintenance.
 - For more information about designing and purchasing signs, contact your Rural Landfill Specialist.
- Homemade signs may need to be replaced or repaired more frequently, but they can be

made from repurposed materials that are already found at the landfill.

- Sometimes signs at the landfill are used for target practice or are made illegible due to graffiti. If the children in the community create homemade signs, people are often less likely to vandalize or shoot at the signs.

Tips for Sign Making:

Rule #1: Use local language

- Signs should be direct and easy to understand.

Rule #2: Keep it short and simple

- People will usually only look at a sign for a few seconds. Whatever they should know, do, or not do should be explained as concisely as possible.
- Simple pictures and drawings can be helpful to convey a message.

Rule #3: Signs must be easy to read

- Choose a clear font and a readable font size. Use contrasting colors for signs for improved visibility.
- Post signs above the winter snow level.
- It is helpful to apply a reflective coating or use reflective paint so signs can be read in winter with headlights.

Rule #4: Maintain the signs

- Are the signs full of holes? Damaged by the weather or faded from sun exposure? Have they fallen to the ground?
- Make sure the signs are routinely replaced, repaired, repainted, rehung, etc.
- Clear vegetation, waste, or any other debris around the signs so they are visible.
- If people can't read the sign, it won't serve its purpose. Help the public help you by providing clear and concise information via signage.

Tips and Tricks for Making Repurposed Signs

- Use recycled items such as old refrigerator and freezer doors, plywood pieces, sheets of metal roofing, etc.
- Use paint from the household hazardous waste collection to paint the signs.
- Involve the local school children to help make signs, as these signs tend to be used less for target practice.

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Sign Examples:

Entrance and Prohibited Waste fabricated signs



Locally made waste placement signs



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Locally made alternative disposal location sign



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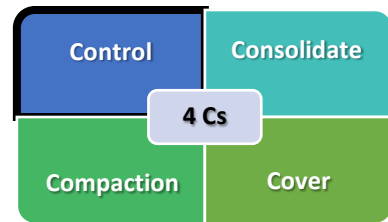


Burning instructions fabricated sign



1.3 Closing the Gate/Access Control

Landfill access control is about making sure that the public is kept safe from the landfill and the landfill is kept safe from the public. Access to the landfill must be limited by the use of fencing, berms, or natural barriers to control public access to the site. (18 AAC 60.220)



There are two types of access control:

Physical Controls (access is limited by barriers)

Fencing

Berms

Other physical barriers
around the landfill

Operational Controls (access is limited by policy and practice)

Restricted hours of use

Restricted hours with
supervision by landfill staff

Access limited to only
landfill staff

Physical controls such as fencing, locking gates, and berms are the first line of defense for landfill access control. Fencing and gates need to be well-maintained to be effective in restricting access to the landfill. If a landfill does not have any physical controls, then obtaining and installing physical controls is the first step to achieving access control at the landfill.

Access control through operational management can be achieved in small steps. For example, the first step might be moving from open access to restricted hours without supervision, then moving to restricted hours with supervision, and finally, restricting landfill access to landfill staff only as a best management practice.



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Restricted hours but unsupervised by landfill staff – This is an option if the landfill has a gate or some physical controls in place but does not have a designated landfill operator yet. With this style of access control, the gate is open only during the landfill’s operating hours, but the operator is not always present to supervise disposal. While this reduces the opportunities for people to access the landfill and improperly dispose of waste, it can still lead to people lighting their own trash on fire or disposing of waste in the wrong place.



Landfill with drop off bin for waste outside of the gate.

Community outreach is important for teaching people that only the operator should light the burn unit and to discourage illegal dumping outside of the landfill. Signs are crucial for guiding people on where and how to dispose of waste.

Restricted hours supervised by landfill staff—This is a great next step to work towards once the community is used to establish hours of operation. With this type of access control, the landfill gate is locked outside of the operating hours and when the landfill is open, the operator is present to supervise disposal. This option allows the operator to control waste placement and screen loads for prohibited wastes. The operator’s job is made easier as they can control all the activities within the landfill.



Locked landfill gate with signage.

With this style of operational management, illegal dumping in the community or outside of the landfill gate can become a problem. However, this can be addressed with outreach to the community members, local ordinances and enforcement, a collection program, and/or staging waste drop off bins outside of the landfill gate.

If a drop off bin is placed outside of the landfill, it should be a container that can easily be emptied frequently so that waste doesn’t build up outside of the landfill.

Access restricted to landfill staff only—This is the gold standard that landfills should work towards. In this option, access to the landfill is limited to landfill staff only, so trash must be collected in bins at the entrance or collected in town with a collection program. Restricting access to only the landfill staff has the benefit of minimizing the potential for people to transfer germs and contaminants from the landfill to the community.

Helpful Tips:

- Physical barriers such as barrels, logs, and moveable fencing keep people out of areas of the landfill that are closed. They can also be used to direct users towards appropriate disposal areas.
- Hanging up game cameras can be successful in catching people dumping waste at the gate or cutting the locks off the gate.
- Stage an after-hours waste receptacle such as a homemade dumpster, a fish tote with a lid, or other container for people to leave their trash in order to keep the wildlife out until the landfill operator arrives to properly dispose of the waste.
- Signs are needed regardless of the access control method to inform people of where and how to dispose of their waste and to list prohibited wastes at the facility.

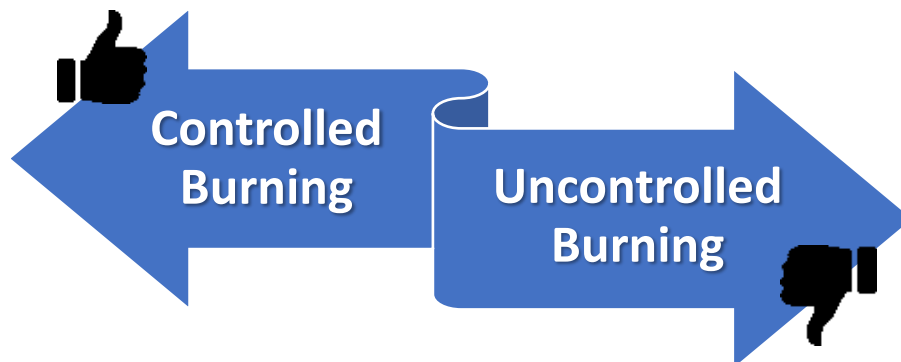
2.0 Burning Waste

It is important to note that a community is not required to burn waste. However, if the community chooses to separate and burn certain wastes, best management practices must be followed to minimize impacts to the community.

Why do communities burn waste?

- Burning separated wastes reduces the volume of waste that needs to be placed in the landfill, so the landfill lasts longer.
- Since the volume of waste is reduced, less cover material is needed.
- Burning food waste reduces animal attraction to the waste and improves landfill safety in areas where wild animals are a hazard.

There are two methods of burning:



Uncontrolled or Open Burning:

Uncontrolled burning, also known as burning waste on the ground, is not an efficient way to burn waste. This method of burning does not burn the waste completely. Instead the waste may smolder for long periods of time, which creates hazardous smoke. These fires also produce uncontrolled fly ash that can start wildfires. Uncontrolled burning does not burn hot and thoroughly enough to prevent environmental and public health hazards.

The risks and impacts of improper burning include air pollution, incomplete combustion (leading to the production of hazardous smoke), the need to use more landfill space, fire hazards, lack of fly ash control, and potential public nuisances (smoke and smell).

Because of the risk and negative impacts, uncontrolled or open burning of municipal waste on the ground is not allowed at Class III landfills.

Controlled Burning:

Controlled burning, which is burning waste within a constructed burn unit, is a more efficient

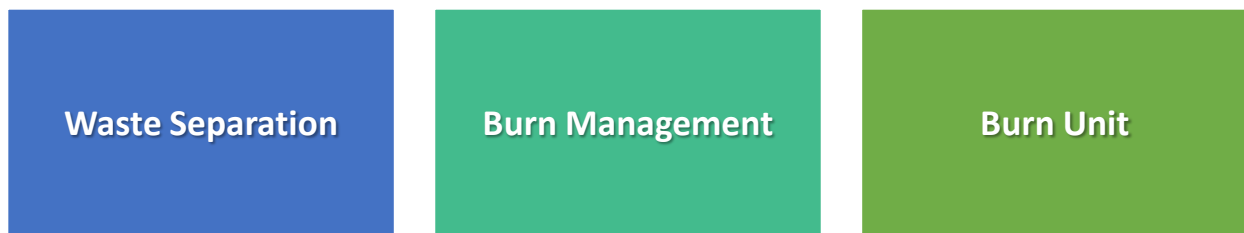
and safer way to burn waste. If waste is properly sorted (see “Waste Management”) and the burn properly managed (see “Burn Management”), a good burn unit helps ensure that the fire burns hot enough to reduce environmental and public health hazards. To burn effectively:

- Waste is segregated (hazardous waste and non-burnables removed) and kept dry
- Only dry waste is placed in the burn unit
- Waste is only lit during favorable wind conditions
- Waste is only lit by the operator who then monitors the fire
- A controlled burn always includes a way to extinguish the fire as necessary

Controlled burning has many benefits. The waste burns hotter, which reduces smoke production, yields a more complete burn, and the resulting ash does not attract animals.

Controlled burning is also safer for the community than uncontrolled burning. Controlled burning reduces the risk of wildfires and reduces the production of hazardous smoke which can drift into the community and/or settle out of the air and impact subsistence resources.

Three key aspects to good burning practices:



These aspects are discussed in detail in the following sections.

2.1 Waste Separation

Burning of plastics, asphalt, rubber, tar, oily wastes, or other materials in a way that gives off black smoke is prohibited. (18 AAC 50.065(b))

Burning is most efficient when the waste is dry, is conducted in a burn unit with plenty of air flow, and the waste streams burned produce little to no smoke. Separating wastes prior to loading the burn unit is an effective way to minimize smoke and ensure that the fire burns clean, hot, and fast.

Waste separation occurs in one of two locations:

At Home

Resident sorts burnables from non-burnables at home and delivers waste to the landfill in separate containers.

At the Landfill

Operator sorts the waste that is delivered to the landfill.

Separating waste at home is the most efficient and least expensive option for a community. It takes less time than separating waste at the landfill because everyone separates their own garbage, which allows the operator more time to focus on other tasks. However, separating at home means that the residents need to accept the responsibility and commit to doing so.

Separating waste at the landfill requires more billable hours for the operator because one person must sort everyone's garbage. This is a viable option if community members are willing to pay additional fees. Personal protective equipment for the operator is also important as they may be exposed to additional safety and health hazards when sorting waste.



Burnable waste segregated into the burn unit.

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The following wastes can be burned:

- Paper
- Cardboard
- Clean wood
- Food waste
- Yard waste or brush cuttings
- Sorted household waste

The following wastes can **NOT** be burned:

- Hazardous waste
- Used oil
- Polluted soil
- Batteries
- Ammunition
- Aerosol cans
- Asbestos containing materials
- PCBs
- Radioactive waste
- Plastics (heavy)
- Styrofoam
- Electronics
- Light bulbs
- Septage waste
- Drums
- Gasoline, diesel, or oil
- Aluminum cans
- Oily rags
- Household chemicals
- Mattresses/Furniture
- Building materials
- Medical waste
- Paint
- Large metals
- Rubber
- Propane cylinders
- Gas canisters



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Helpful Tips:

- Post clear signage listing burnable items and non-burnable items at the landfill and around town if waste is separated at home.
- Post signage stating where and how to dispose of or recycle non-burnable items.

Examples:



Burn unit with a sign nearby describing where burnable and non-burnable waste should be placed.



Sign with instructions for the burn unit.

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Sign outlining burnable vs non-burnable wastes.

2.2 Burn Management

Burning must be contained, controlled, and managed to minimize adverse environmental effects and limit the amount of smoke generated. (18 AAC 60.233, 18 AAC 60.355, 18 AAC 50.065(b))

Key aspects of good burn management:

Waste should be kept dry.

Burn unit should be loaded, lit, and monitored by the operator.

Burning should only occur in appropriate weather.

Why are these actions important?

- Waste that is kept dry lights more easily and burns at hotter temperatures. Hotter temperatures lead to more efficient burning so less smoke is generated, and more waste is turned to ash.
- Having **only** the operator load, light, and monitor the burn unit ensures a more complete and efficient burn, reduces the risk of injury to landfill users, and reduces the risk of a fire escaping the landfill.



Waste kept dry prior to burning.

- Burning should only occur when the weather conditions are appropriate. It is not safe to burn in windy conditions or during a burn ban, as that increases the risk of causing a wildfire. It is also best to burn when the wind is blowing away from town so that potentially hazardous smoke does not drift towards the community.

Helpful Tips:

- A fire extinguisher or other fire suppression equipment, such as a loader with a bucket full of soil, must be kept near the burn unit for safety. Having a water tank and a pump or a gravity-fed hose staged at the landfill is a great idea during the dry season while burning. Having a fire suppression system already staged at the landfill will be worth the effort and investment in case it is ever needed.
- Check the weather report for predicted high winds or for the potential of wind blowing

towards the community.

- In the summer months **check for a burn ban prior to igniting waste** by contacting the Department of Natural Resources or the Bureau of Land Management. The regional number for burn ban information can be found in your landfill permit.
- Don't let the waste smolder or create black smoke.
- Clear brush, dead trees, and dead vegetation within a 50-foot boundary surrounding the landfill to prevent wildfires. It is strongly recommended by Alaska's wildfire professionals to increase the firebreak to 90 feet, if possible. This recommendation is anticipated to become required for new facilities, so new landfills and lateral expansions should have a 90-foot firebreak incorporated into the design.
- Maintain a firebreak 25 feet wide down to soil around the burn unit and any staging area for hot ash.
 - If you live in an area of permafrost, it is best to keep the tundra vegetation in place. However, cutting the brush away from the burn unit and fence is still helpful for controlling fires and is considered a best management practice if your landfill does not include a gravel pad to protect permafrost. A maintained gravel pad is acceptable for maintaining a firebreak around a burn unit in permafrost areas, but it must be maintained, and grasses and shrubs must be removed.
- **Ensure that ash is completely cool before placing it at the working face.**
- **Ash residue** from burning can contain toxic pollutants, so be sure to manage it appropriately by **covering it with soil** and **not placing it in or near water**.

Personal Protective Equipment (PPE): At a minimum, the landfill operator should be wearing an OSHA compliant half mask respirator with cartridge filters for smoke and volatile organic compounds (VOCs) if they will be exposed to smoke from the burn unit while it is burning. Proper fit testing is required if a respirator is needed for the job, in order to ensure that it is protecting the individual who needs to rely on that equipment to protect them from hazards they may be exposed to while performing their job duties.

Examples of burn management:



Waste transfer from the collection trailer to the burn unit by the operator.



Covered storage to keep waste dry prior to burning.

2.3 Burn Unit

Uncontrolled or uncontained burning of municipal waste on the ground is not allowed at Class III landfills. Burning must be conducted in a burn unit, burn cage, or other device where the fire is contained and controlled. (18 AAC 60.233, 18 AAC 60.355)

Important features of a burn unit:

Be enclosed or at a minimum be a burn cage

Good airflow

A smokestack

An easy way to empty the ash

Burn units need adequate air flow to provide a complete burn. When purchasing a burn unit, follow the manufacturer's specifications on loading and operating the burn unit to allow enough air to feed the fire. Keeping air vents clear is a must.

A smokestack with a spark arrestor helps direct the smoke up and away from the people on the ground, as well as helps keep sparks and fly ash from escaping the burn unit and causing wildfires. The smokestack also provides ventilation for better combustion.

Purchase or construct a burn unit that is easy to empty using equipment that is already available in the community. If it is not easy to empty the ash, the unit will often become packed with ash, reducing air flow and eventually making the unit unusable.

Factors in choosing the right burn unit:

The number of residents in the community affects the size and type of burn unit to select for the landfill. Most manufacturers will state how many people their burn units are meant to serve so it is important to obtain this information in order to purchase the correct size for the community. A larger community (more than 300 people) may require more than one burn unit, or a larger version of the unit, to suit its needs. A burn unit scaled to fit the community size can be constructed out of local materials for use at the landfill.

The type of equipment on site also impacts the type of burn unit that should be selected for the landfill. It is important to buy or build a burn unit that can easily be emptied using the equipment that is available.

The method of waste collection will also help determine the type of burn unit needed. For example, if waste is collected in large dumpsters (like hook trucks), it would be a lot of work to hand load the trash into a barrel-style burn unit, and a burn cage would be a better choice.

Helpful Tips:

- No matter which burn unit is used, it is important to regularly remove the cooled ash, preferably before the next burn. Ash build-up decreases both air flow and burning temperatures, causing incomplete burns. An easy tip for remembering this is to remember the phrase: **never put trash on top of ash!**
- Once the ash is completely cooled, it should be treated like regular garbage and covered with soil or alternative cover material. Wind and water can move the ash offsite impacting nearby areas and creating potential health hazards. Ash should be covered each time it is placed into the working face to prevent the migration of ash offsite.
- For examples of both manufactured and homemade burn units, more photographs, to obtain assistance finding websites or manufacturers, or for any other help in finding the burn unit that is right for a given community, contact your ADEC Rural Landfill Specialist.

Examples



Enclosed commercial burn unit.

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Enclosed commercial burn unit.



Commercial burn unit.



Homemade burn unit.



Homemade burn unit.



Homemade burn unit.

3.0 Landfill Operation

3.1 Operator

The landfill operator is an individual who has the right training and equipment to manage the landfill safely. This individual is responsible for the safety of everyone who visits the landfill.

Operator's Role:

The operator's role is site specific based on the landfill operations and community needs. At a minimum, the landfill operator is responsible for ensuring that the landfill is managed in compliance with the regulations.

In this role, common landfill operator responsibilities include burn unit operation, visual monitoring, water/snow management, and the 4 Cs (access control, consolidation, compaction, and covering of the waste). Additional operator responsibilities can also include the following:

- Waste collection
- Heavy equipment operation
- Landfill access control
- Waste screening
- Landfill equipment maintenance
- Landfill safety
- Any other activities needed to run your landfill
- Assisting with landfill permitting and operations plans
- Reporting to local Council

Helpful Tips:

- In order to perform this job effectively, the operator must have sufficient training.
- The landfill operator can be funded through collected landfill fees or any other sustainable program that works best for the community.
- Consider offering a job share program to reduce the operator turnover rate. A job share program is when two or more individuals share the job of landfill



Landfill operators wearing PPE.

operator. Sharing this job gives each person more time away from the job. This reduces the stress on each person and allows each person to plan subsistence activities and

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other obligations for those times when they are not serving as landfill operator. Each individual sharing the job must be appropriately trained.

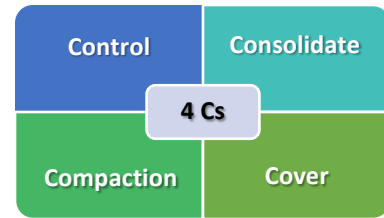
Examples:



Landfill operator consolidating waste.

3.2 Equipment

Access to and use of heavy equipment is essential to good landfill operations. Equipment plays an integral role in many aspects of properly maintaining the facility.



Uses for equipment in the landfill:

- Consolidating and compacting waste
- Applying cover
- Digging trenches or building berms
- Snow removal and road maintenance
- Landfill cleanup
- Emptying the burn unit
- Staging backhaul
- Staging vehicles for burial
- Installing fence posts
- Other uses as needed

Benefits to using equipment:

- Minimizes operator contact with the waste
- Ability to compact and cover the waste
- Less labor intensive
- Ability to move heavy material
- Ability to perform more work in less time
- Safety

Costs of equipment:

- Purchase price and shipping
- Maintenance and mechanic
- Operator training
- Breakdowns and repairs
- Parts, including tires or tracks
- Fuel, oil, diesel exhaust fluid, hydraulic oil

Maintenance:

Equipment needs maintenance! Routine maintenance, such as changing the oil, fuel filters, and air filters, should be carried out on the schedule defined by the manufacturer. Most manufacturers have specific maintenance manuals available online for each type of equipment. Failure to perform routine maintenance can lead to expensive repairs or equipment that is no longer usable. Hiring a manufacturer certified mechanic to inspect and maintain the equipment annually will keep it running longer and more smoothly for many years.

How to select heavy equipment:

Examples of heavy equipment utilized by landfills are bulldozers, loaders, dump trucks, excavators, brush grubbers, skid steers, trash trucks, and compacting trash trucks. The size and type of heavy equipment should match the landfill size and design. If a large dozer is used at a

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very small landfill, it will be very difficult to operate and maneuver within the facility. On the other hand, a small Bobcat will lack the capability to appropriately manage the waste at a multi-acre facility.

If a facility can only afford one piece of equipment for the landfill, then the best option may be a piece of equipment that can perform multiple functions.

Types of heavy equipment:

Dozer/Crawler:

- Best for consolidation and compaction
- Can be used to spread and compact cover material
- Road building and maintenance

Skid Steer:

- Accepts many attachments
- Light duty use in a landfill such as consolidation or applying cover
- A step up from hand labor
- In the landfill, foam-filled tires work best at preventing flats
- Fits in a conex box for secured storage

Excavator:

- Works well for moving and compacting waste
- Can be utilized in preparing scrap/recyclable materials
- Can be utilized in crushing vehicles or white goods prior to disposal
- Can be used to apply cover with a blade
- Generally used in conjunction with other equipment
- If possible, adding a thumb to the bucket makes it much more versatile
- Works well for digging trenches



Dozer



Skid Steer



Excavator



Wheeled Loader

Wheeled Loader:

- Equipment can be used for many village applications
- Accepts many different attachments
- Needs foam-filled tires to avoid punctures if used in a landfill
- Can be used to empty ash from locally made burn units if designed with fork pockets or skids.

Other solid waste equipment to consider:

In addition to heavy equipment, there are many types of equipment that can be utilized to augment a solid waste program:

- Used oil furnace for clean or filtered used oil
- Smart ash burner for sorbents and oily rags
- Smart ash burner Oil Away attachment for dirty used oil
- Pneumatic post drivers for easy fence or sign installation
- Aluminum can crusher for bulk processing
- Drum crusher
- Aerosol can processor
- Collection trailers or transfer bins
- Household hazardous waste collection containers
- Balers – used to reduce the volume of waste going into landfills. Small balers are often used for diverted materials such as cardboard and aluminum cans.
- Other miscellaneous equipment – talk to your ADEC Rural Landfill Specialist about what might be needed or wanted at the landfill

Helpful Tips:

- Tires should be foam-filled or solid tires to prevent flats while working in the landfill.
- Seasonal timing is important when getting heavy equipment to the landfill. Plan to work around spring break up, the rainy fall season, the dead of winter, or other seasonally challenging times that could lead to equipment getting stuck on the roadways or at the landfill.
- If heavy equipment is mobilized to a community for a water, wastewater, or airport project, the contractor can be requested to assist with the landfill by consolidating, compacting, and covering waste, or by hauling extra cover material to the landfill. This assistance can often be worked out as part of the payment for accepting waste from the project at the landfill. If you choose to accept help from a contractor, make sure there are rules in place on how the waste should be placed and handled.

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Examples:



Operator using a dozer to consolidate waste.



Collection of various heavy equipment staged for a construction project.

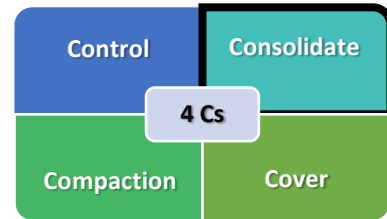
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Skid steer staged at the landfill.

3.3 Working Face

The working face is the active part of the landfill where waste is placed for disposal. The working face must be kept as small as practicable. (18 AAC 60.345)



What is a working face?

The landfill working face is the area where sorted waste is placed for final compaction and permanent disposal. There can be different working faces across the landfill for different types of waste. For example, a landfill could have a working face for household waste and a working face for construction and demolition debris.

In an area fill landfill, the working face is located at the foot of the pile of waste that is waiting to be compacted and covered. In a trench-and-fill style landfill, the working face is located inside the trench.



Working face at an area fill.

The working face must be kept as small as possible. Ideally, the working face in an area fill shouldn't be any wider than 50 feet as this helps reduce litter and other issues with waste. A small working face also requires less cover material. In a trench-and-fill, the working face should be kept to one end of the trench and should be compacted and covered often.



Working face at a trench-and-fill landfill.

Part of the landfill operator's duties include creating and maintaining the working face. If a landfill doesn't have an operator, then everyone in the community must understand where to place the waste to create and maintain a working face. Often a sign that says "DUMP HERE" with an arrow is used to designate the working face. Otherwise, waste will be spread across the entire landfill site and the landfill will quickly become unmanageable.

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A small working face provides many benefits including:

- Minimizes the amount of waste that is in contact with rain, snow, or other potential water sources.
- Reduces operator time and equipment costs.
- Reduces the amount of windblown litter.
- Reduces the amount of cover material needed.
- More efficient compaction of the waste since the waste is managed in smaller sections.
- Keeps the landfill looking organized and well-maintained.

Examples:



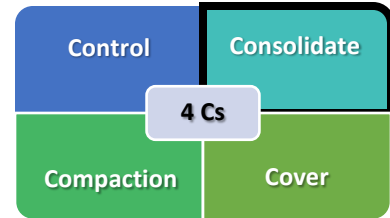
Working face at an area fill landfill.



Trench-and-fill working face.

3.4 Consolidation

Consolidation is one of the most important steps for managing a Class III landfill. Any landfill operator, whether they have heavy equipment or not, can consolidate waste with a little planning.



What is consolidation?

Waste consolidation is gathering similar wastes in a smaller designated space. The goal of consolidation is to reduce the working face to the smallest area possible.

The opposite of waste consolidation is having waste spread over the entire landfill site. This makes it difficult for users to safely dispose of waste and for operators to manage the waste. The best way to combat this issue is to control access to the landfill, keep a landfill operator on site during open hours, and use signage to direct users to the proper working face and storage areas.



Trench-and-Fill landfill. All the waste is consolidated into one half of the trench. Notice that the waste is not spread across the site.

How to consolidate:

The operator should gather the waste and place it at the working face. The working face should be kept as small as possible with consolidation as needed. If the landfill allows users to dispose of their own waste, then steps should be taken (e.g. using signs and barriers) to ensure that the landfill users place their waste at the working face.

If your landfill does not have heavy equipment, it becomes even more important to use signage, barriers, and education to ensure that landfill users dispose of waste in the correct areas. Regularly collecting litter and placing it in the working face will also help guide users to place their waste in the working face because they won't see waste scattered across the site.

The key to consolidation is to make sure the waste is placed in the right place and the working face is kept as small as possible.

Why consolidate waste?

- Consolidating the waste cuts the overall operation costs for the landfill. A small pile of waste is cheaper to compact and cover.
 - A consolidated waste pile gets the most use out of a limited supply of cover material.

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- Consolidating the waste reduces the potential for litter, odor, and leachate.
- Consolidation decreased environmental risks and improves the function of the landfill.
- Contractors and the public are more likely to follow the rules in a clean landfill.

Examples:



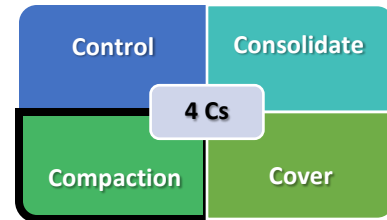
Area fill landfill with the household waste consolidated behind the burn unit. The waste on the left side is construction and demolition debris.



Area fill landfill with two separate working faces demonstrating excellent consolidation. The household garbage working face is near where the cars are parked, allowing easy drop off by the public. The larger working face towards the back of the landfill is for metals.

3.5 Compaction

Compaction is the next step in waste management at the landfill. Compacting consolidated waste will extend the usable life of the landfill and help prevent many problems.



What is compaction?

Compaction is using pressure or force to reduce the overall volume of trash either prior to placing it in the landfill, with a garbage truck compactor or waste baler, or with heavy equipment after it is placed into the landfill.

How to compact:

The heavy equipment, preferably a tracked vehicle, is driven back and forth across the waste approximately 4 to 6 times to crush the waste and reduce the volume prior to placing cover material. An excavator is often used to compact wastes in a trench using the bucket.

Benefits of compaction:

- Increases the available volume of space
- Extends the life of the landfill
- Reduces leachate by minimizing the amount of water passing through the waste
- Reduces wildlife access to the waste
- Reduces windblown litter
- Reduces uneven settlement after the landfill closes, which may result in ponding and the need to regrade the landfill post-closure.

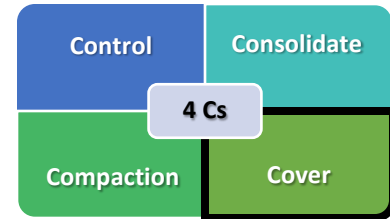
Examples:



Working face that has been compacted and covered.

3.6 Cover

Waste must be covered by 6 inches of soil or an approved alternative cover as necessary to control disease vectors, fire, odor, blowing litter, and scavenging. (18 AAC 60.345)



What is cover?

Cover material is soil (e.g. gravel, sand, or silt) or other approved material placed on top of the waste to reduce water infiltration, animal attraction, and windblown litter. For the most efficient use of cover material, first consolidate and compact the waste. Consolidating and compacting the waste greatly reduces the amount of cover material needed.

Waste should be covered as often as necessary to control vectors, odor, litter, and animal attraction. Each time this is done, at least 6 inches of compacted cover should be applied to the waste.

In situations where soil material is not available, ADEC may approve an alternative cover. The most common types of alternative cover include the use of large tarps weighted down to prevent them from being blown away, large sections of carpet, sheetrock, compost, and crushed glass.

**All cover material
should be compacted
to minimize water and
vectors**

Benefits of cover:

- Reduces the ability for water to flow through the waste and create leachate
- Reduces odors
- Reduces windblown litter from the landfill
- Reduces the attraction of animals to the waste

Helpful Tips:

- Cover material is more frequently used if it is stockpiled at the landfill.
- Capitalize on heavy equipment and potential soil generated from other projects in your community. Often it is enough just to ask, in order for leftover dirt or gravel to be hauled to the landfill for future use as cover.

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Examples:



Waste recently covered.



Stockpiled cover material.

3.7 Grading for Water Management and Erosion Control

The landfill should be graded to promote water runoff. Berms and cover material should be graded to reduce erosion, preserve the stability of the landfill, and prevent ponding. (18 AAC 60.390, 18 AAC 60.243)

The grade or slope of a landfill plays an important role in keeping the landfill stable by keeping berms and cover material in place. When done correctly, it also prevents water from ponding near the working face or anywhere on site. If a landfill is too flat, water will pool, and it is a challenge to appropriately manage run-on and run-off. If any part of the landfill is too steep, water running off the slope will carry gravel or dirt resulting in erosion of the landfill.

What is grading?

Grading creates a contoured surface at the landfill to prevent ponding and direct water away from the waste. The process of grading will fill in low spots and remove high or unstable spots. Grading can be achieved with various sizes of heavy equipment, anything from a small bucket on a skidsteer to a full-sized bucket on an excavator or a dozer with a blade

How to grade a landfill:

Add material where needed to raise the ground surface and smooth out the area to maintain a gentle slope that will direct water off the site. Compacting the material by running the heavy equipment over it will help the new material settle and will assist in determining where material needs to be added or taken away to achieve a gentle slope. Grading should work with the existing slope of the land if possible.

Maintaining a grade:

Waste decomposes at different rates depending on the type of waste and the local environment. Waste buried up to a decade ago may create a low spot as it decomposes causing water to pond at the landfill. Placing material onto the low spot to build it back up so it is similar in height to the surrounding land is one example of maintaining a grade. Another example is identifying how water runs off the landfill site and grading the surface to ensure that the water drains to a particular spot such as into a drainage ditch. In general, surface water should drain away from the waste disposal site.

Helpful Tips:

- Fill the landfill from the highest point to the lowest point, whether it is a trench-and-fill or an area fill.
- When applying cover to the working face, make sure that the cover material is compacted and sloped (2 or 3 degrees, very slight slope) to direct water away from the waste. However, be careful that the slope is not so steep that all of the cover material washes away with rain or snow melt.

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- If the landfill is located on a hillside or at the bottom of a hill, then berms or drainage ditches are required on the uphill side of the landfill to keep any water from flowing onto the site.
- Berms on the outside of the landfill should be sloped to keep runoff from rain and snow melt from washing them out.
- Running tracked equipment up the berms called “track walking”, helps to reduce erosion and keeps the soil material in place as designed.
- Plan ahead by grading the landfill in the fall so spring snow melt will be directed away from waste disposed of during the winter months.
- The side slopes within a trench-and-fill should be constructed to prevent cave-ins, which can be a safety hazard.
- Design and construct simple drainage controls in the landfill to direct water away from the waste. Examples of drainage controls include:
 - A trench filled with gravel at the base of the berms.
 - Shallow drainage ditches to direct water out of the landfill.
 - Diversion ditches or berms to prevent water from flowing into the landfill.

Examples:



Cover material at the working face graded to promote water drainage away from the waste. Water is draining away from the working face following the arrows.

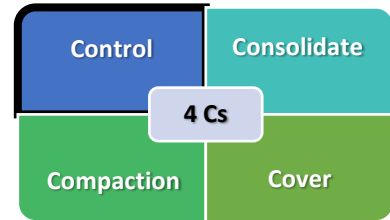
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Engineered drainage system to prevent water from running onto the waste from the berms surrounding the facility.

3.8 Detering Wildlife

The operator shall minimize, to the extent practicable, access by wildlife and domestic animals to putrescible waste deposited at the landfill. (18 AAC 60.230, 18 AAC 60.233)



Operational controls for reducing animal attraction to the landfill:

- Don't allow unconsolidated and uncovered waste to accumulate inside or outside of the landfill. Consolidate the waste as often as possible.
- Apply at least 6 inches of compacted cover material as often as possible.
- Burn household waste and food waste in a burn unit.
- Light and empty the burn unit often and cover the ash.

Engineered controls for reducing animal attraction to the landfill:

- Install an electric bear fence if bears are commonly present in or near the landfill. Cut brush and weeds from under the fence, or the fence will short out and be ineffective.
- Install a regular fence and locking gate to keep out dogs, foxes, and other small mammals.
- Install the fence posts deep in the ground so the fence isn't easily pushed over.
- If bears are an issue, install fence below ground to create a skirt around the landfill. This prevents digging under the fence to gain access to the landfill. Consult bear biologists or your rural landfill specialist to determine the appropriate size and design of skirt needed for your facility.
- Provide bear-proof and bird-proof trash containers outside of the landfill gate or in town for waste collection.
- Use containers, dumpsters, or trash cages with hinged lids that can't be removed. This will help ensure that the lid remains closed so that birds cannot pull the waste out and scatter it.



Electric fence to keep bears out of the landfill.

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Examples:



Well-managed landfill that is not likely to attract wildlife.



Collection bin that closes to prevent wildlife access.

3.9 Preventing the Spread of Germs and Diseases from the Landfill

Disease vectors must be controlled so that the public health, safety, or welfare are not endangered, and so that they do not create a nuisance. (18 AAC 60.230, 18 AAC 60.233)

What is a vector?

A vector is a carrier of a disease-causing agent. Potential vectors at landfills can be people, dogs, birds, bears, foxes, rodents, insects, four wheelers, flies, etc. At a landfill, anything that comes into contact with waste and leaves the landfill has the potential to be a vector.

It is important to control vectors at the landfill since they can transport germs and contaminants back into the community. Once tracked back to the community, those germs and contaminants can pass to people or food sources. For example, if someone enters the landfill with their four-wheeler and then takes the same four-wheeler to go berry picking, they will transport germs and contaminants from the landfill to the berry patch. If someone drops their trash off at the landfill and walks through soiled baby diapers, and then they don't remove their shoes at the door when returning home, germs will be tracked onto the floor of their home. This particularly endangers small children because they spend so much time on the floor.

How to control vectors:

With so many options for potential vectors, from people to animals to insects to vehicles, it may seem like controlling them is impossible. However, by following a few basic practices at the landfill, it is possible to effectively manage potential vectors and prevent the spread of germs and contaminants.

- Access control: Using a gate to keep the public out and only allowing the operator into the landfill is one of the best methods for controlling the spread of germs and contaminants. Fewer people, vehicles, and animals in the landfill means fewer germs and contaminants leaving the landfill. (For more information, see the section on Access Control.)
- Consolidation: Keeping the waste contained to the working face minimizes the amount of exposed waste at the landfill. Compared to a landfill with waste distributed across the whole site, visitors to a landfill with a consolidated waste pile are much less likely to pick up germs from the waste.



Locked landfill gate with open hours listed.

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- **Burning:** Burning food waste in a burn unit is another good way to reduce the number of germs for vectors to encounter. Burning food waste means the waste isn't decomposing in the landfill attracting flies, and breeding bacteria. (For more information see the section on Burning.) However, while burning reduces the vector attraction at the landfill it also increases the potential health risks to people through exposure to smoke and ash if not handled properly.



People wearing shoe covers at the landfill to avoid tracking germs and contaminants back to the community.

- **Cover material:** Covering the waste with at least 6 inches of compacted cover material prevents many different types of vectors from coming into contact with the waste. The 6-inch depth prevents flies from laying eggs in the waste, birds from scattering trash, and keeps foxes and bears from getting into the waste. Covering the waste is an important part of proper waste management. To control vectors, cover should be added regularly to household trash, animal carcass pits, ash from the burn unit, and septage trenches.
- **Proper management of animal carcass pits and septage trenches** can also reduce the potential for vectors to encounter germs and contaminants. (See the Animal Carcass and Septage sections.)
- **Operator PPE (Personal Protective Equipment):** Operators can also become vectors in the landfill if they do not have separate clothes, boots, gloves, etc. for landfill use. Employers must provide the operator with appropriate PPE.



Operating wearing PPE to protect their clothing from germs and contaminants.

Wearing landfill clothes home is like bringing the landfill into the kitchen. It is a good idea to have a storage shed at the landfill where the operator or trash haulers can change into and out of their dedicated landfill gear when working at the landfill. If a community does not have water and sewer or a dedicated washing machine for dirty overalls and PPE, disposable coveralls and PPE are recommended.

3.10 Litter

Litter comes from windblown debris and improper disposal, and it can be a long-term repetitive issue if not controlled at the landfill. Litter must be controlled so that it does not become a nuisance or hazard. (18 AAC 60.233, 18 AAC 60.345)

Litter cleanup:

The best way to handle landfill litter is to prevent it in the first place. Consolidating waste and applying cover material regularly are the best long-term solutions in order to prevent litter. However, even with precautions, windblown waste becoming litter is a reality at most landfills, and regular litter clean-ups are a necessity for landfill operators. An annual community litter clean-up after spring breakup is a great practice, but ideally litter should be cleaned up year round. The operator should pick up litter or improperly disposed of waste in and around the facility at least monthly and dispose of it at the working face.

Helpful tips to prevent litter:

- Consolidate, compact, and cover waste frequently.
- Cover waste with 6 inches of compacted soil as needed, to reduce windblown litter and to keep the birds and animals from picking open trash bags.
- Bend the top wire of the landfill fence towards the inside of the landfill to help catch windblown litter, or use barbed wire angled towards the landfill to catch litter. The fence must be cleaned frequently to ensure that it is still able to catch litter and doesn't get blown over.
- Build a homemade moveable litter fence.
- If most of the windblown litter in the landfill ends up in the same area, consider installing another section of fence outside the landfill fence to catch any litter that escapes the landfill.
- Keep the landfill entrance clear and clean. If trash is dumped near the entrance, it has a higher chance of being spread outside of the landfill.
- Place a covered collection box near the landfill entrance for trash that arrives outside specified landfill hours. This will keep it in a centralized location and out of reach of birds and animals until the landfill operator arrives to take care of it.
- Promote the recycling of aluminum cans and plastic #1 and #2 bottles to reduce litter.



Sign reminding disposers to minimize litter by putting trash inside the landfill fence.

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- Pass local ordinances against plastic bags and littering to help prevent litter rather than spending time and money to clean it up.

Examples:



Homemade moveable litter fence near a trench.



No litter sign near a landfill.



A landfill with minimal litter at the site.

3.11 Maintenance

Maintenance keeps things functional at the landfill. The landfill must maintain structures and components of the facility and repair any structural changes or damage to the facility. (18 AAC 60.815)

General maintenance requirements:

Maintenance is an integral part of running a successful landfill. The purpose of maintenance is to keep the landfill structures and associated equipment in good working condition. Performing routine general maintenance prolongs the life of the equipment and reduces the cost of running the landfill.

Some common maintenance categories include:

- Vehicles
- Equipment
- Burn units
- Recycling and backhaul storage/building
- Signs
- Firebreaks
- Fences/gates
- Buildings
- Household hazardous waste storage
- Litter cleanup

How to determine maintenance needs:

One of the best ways to determine if something at the landfill needs maintenance or repairs is through monthly visual monitoring. Each month, the landfill operator inspects all of the components of the landfill and makes notes of the conditions. This is an excellent way to identify when things are starting to show wear and tear and might need repairs soon. Since the visual monitoring forms are kept for 5 years, they can be reviewed to determine if certain things require maintenance every spring or fall, etc. so that the operator can plan for maintenance activities. Visual monitoring is also a good resource for new employees as it shows what happens at the landfill on an annual basis.

Helpful Tips:

- Setting aside some money each year for maintenance of the landfill and dedicated equipment can keep the landfill running smoothly for years.
- Burn units need maintenance, too. Repair popped welds or cracks promptly and add a coat of high temp paint to keep it from rusting. Repair or replace spark arrestors when needed to prevent sparks from escaping and causing accidental fires.
- Some commercial burn units have user manuals and troubleshooting guides available online.
- Most manufacturers have a maintenance manual available online for heavy equipment. The manual will specify a schedule of preventative maintenance of what should be done at specific operation hour intervals such as changing the oil, fuel filters, air filters, spark

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plugs, and greasing tracks or wheels. Follow the prescribed maintenance schedule to extend the life of heavy equipment.

Examples:



Clean well-maintained equipment used to water the landfill road to help prevent dust.



Storing heavy equipment inside cuts down on maintenance needs.

4.0 Landfill Water Impacts

In order to understand how landfills can impact the water, it is important to first understand the different types of water associated with landfills.

- Groundwater: water below the landfill surface in the zone of saturation.
- Surface water: water that is open to the atmosphere and subject to surface run-off, or water from springs, wells, or other collectors directly influenced by surface water. Examples of surface water include rivers, streams, wetlands, tundra ponds, the ocean, etc.
- Run-off: rainwater, leachate, or other liquid that drains over land from any part of the landfill.
- Storm water: water that originates from precipitation including rain, snow, and ice melt.

4.1 Leachate

Prevention is the best strategy when it comes to leachate. Leachate must be prevented, and leachate seeps must be contained and controlled. Waste may not be placed in surface water. (18 AAC 60.225)

What is leachate?

Leachate is contaminated water created when water and garbage mix. The water pulls contaminants out of the garbage with which it comes into contact. Leachate can also be caused by the water content of the waste itself, which is released when the trash decomposes.

Why is controlling leachate important?

Leachate can be harmful to human health if it enters the community's water supply and may be harmful to subsistence resources.



Leachate is created when water and garbage mix. Waste should not be in contact with water.

Helpful Tips:

- Storm water and snow management are key in preventing leachate. In the winter, it is important to manage snow in the landfill. Water from snowmelt can easily pond in the landfill. The more snow that is in the landfill during breakup the higher the potential for

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leachate production. The more snow that is removed from the landfill, the better.

- Look for any signs of leachate such as orange staining, orange/reddish-brown water, or dead vegetation. If signs of leachate are visible, identify the source and call your ADEC Rural Landfill Specialist for assistance.
- Do not dispose of liquids, such as paint, cooking oil, antifreeze, and used oil, in the landfill. Disposing of liquids in the landfill can create leachate.
- Do not place waste into puddles, ponds, or other water sources as this will create leachate.
- The best way to prevent leachate is to keep water out of the landfill with good compaction and regular compacted cover.

Examples of what leachate looks like:



Leachate, as indicated by red and orange staining, where the waste and water are in contact.

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Orange staining and dead vegetation characteristic of a leachate seep.



Orange staining near the waste caused by leachate. The waste should be covered to prevent the formation of leachate.

4.2 Storm Water Controls

A landfill must be constructed and operated so that seasonal flooding is temporary in duration. The landfill must minimize contact between storm water and waste. Ponded water must be removed within 30 days. (18 AAC 60.225)



Methods for storm water controls:

Water diversion:

- Outside the landfill, divert surface water or storm water around the landfill through the use of ditches, trenches, culverts, or berms (“diversion structures”).
 - Within the landfill, prevent leachate by channeling water away from the waste and out of the landfill.
- 
- The photograph shows a gravel-lined drainage ditch or berm at a landfill site. Two large yellow arrows are overlaid on the image, pointing from left to right, indicating the direction of water flow away from the waste area. In the background, a piece of heavy machinery is visible on a dirt road.
- Engineered drainage system to prevent storm water from coming into contact with the waste.*
- Ensure that storm water diversion structures are sized to handle seasonal flows of water, such as during spring breakup and the rainy season.
 - Storm water diversion structures require routine maintenance to ensure they work properly. This means keeping them free of litter, brush, and overgrowth.
 - Ensure that ditches, culverts, and trenches are free of debris in the fall before the snow falls so that they are more functional in the spring when they are needed most.

Landfill construction:

- Build the landfill with a slight grade so storm water will naturally run out of the landfill.
- Place waste in the landfill from the highest point to the lowest point so that water in the landfill flows away from the waste.

Snow Management:

- Identify an area away from waste and downslope of the landfill to use for a snow dump.
- Remove snow from disposal areas as it accumulates.
- Erect snow fences to keep blowing snow out of the landfill and minimize snow drift.
- If there is a prevailing wind direction, construct the trenches so that they don't fill with snow or build a tall berm on the upwind side to create a snow break.

How to deal with seasonal ponding:

The best way to handle seasonal ponding is through prevention. To prevent ponding, it is important to have the landfill appropriately graded for water drainage. The installation of culverts, ditches, and berms will also prevent water from entering the landfill. If during operations the operator notices a low spot in the landfill near the waste, then the operator should fill it in with soil material to prevent ponding.

Regular compaction and cover can also reduce the risk of ponding that can occur as the result of the uneven settling of waste in the landfill. If the waste is properly compacted and covered it shouldn't settle as much, creating low spots that collect water.

If ponding is identified in the landfill it is important to NOT pump the water off the landfill site, property boundary, or into another water body. The water should be managed on site, either by filling in the low spot with soil material or by directing the water so it will naturally drain or evaporate.

Examples:



Snow cleared from the road within the landfill and away from the working face.

4.3 Impact to Permafrost

If your landfill is in an area with permafrost, it is important to design and operate the landfill to keep the underlying permafrost frozen. If the landfill settles and water is pooling, it has the potential to affect the permafrost so the operator must take corrective action. (18 AAC 60.227)

Why do we worry about the presence of permafrost?

Many research studies over the past couple of decades have reported that the annual average temperature of permafrost is increasing. Although it still maintains a temperature below freezing, it is becoming more unstable both in areas of continuous and discontinuous permafrost. As waste decomposes, it generates heat that, without good separation and operations, can thaw the permafrost beneath the landfill.



Landfill built on a thick pad to protect the permafrost beneath it.

How do we operate a landfill built on permafrost?

It is important to remember that if a landfill is located on permafrost, trenches and pits should not be dug as these will quickly fill with water in the summer months. The landfill must be an area fill that is built up to protect the permafrost.

It is especially important not to allow water to pond within landfills built on permafrost. Pooled water can absorb and hold substantial heat, which reduces the insulating value of the landfill pad. This can then cause thawing of the permafrost beneath the pad. Once begun, this thawing effect can quickly spread through the underlying permafrost. This is difficult to reverse, but corrective action must be taken and will require an engineered solution.

Examples:



An example of a landfill built on a pad above permafrost prior to waste placement

4.4 Impact to Wetlands

If a landfill is located in or near a wetland, it is important to not cause or contribute to the degradation or damage of the wetlands. (18 AAC 60.315)

Why do we worry about wetlands and landfills?

Waste in wet environments produces leachate! Wetlands in Alaska are often underlain by clay soils and/or permafrost, which have minimal drainage that result in large ponded areas. This means that if a landfill produces leachate, that leachate can quickly and easily spread throughout the surrounding environment.

Since wetlands can be easily impacted by landfills, it is important to not pick berries or harvest wild foods or medicinal plants in a wetland near the landfill. Wetlands

slow down water flow, which can allow plants to uptake any contamination the water may be carrying.



Above-grade area fill surrounded by wetlands.

Helpful tips:

- It is vital to establish good storm water management to reduce leachate and keep wetlands clean.
- Windblown litter can be difficult to collect in wetland areas, so it is best to prevent it by adding cover material to trash regularly and by maintaining fencing. A second fence or a vertical mesh extension for an existing fence may be a good alternative to prevent windblown litter, if cover material is not readily available.
- When building a landfill in wetlands, a permit from the United States Army Corps of Engineers may be required.
- Consistent and regular waste compaction combined with frequent cover decreases the percolation of water through the waste and the production of leachate.

Examples:



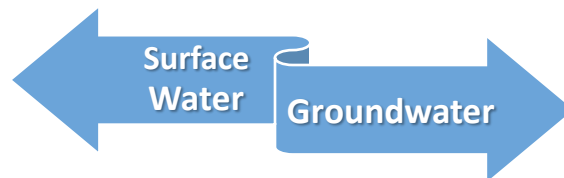
Berms and fencing surrounding an above-grade area fill in wetlands. The berms provide a wall against which to compact waste and help keep the landfill separate from the wetlands, while the fencing helps to contain windblown litter.

4.5 Water Monitoring

If surface water or groundwater monitoring is required, the facility must follow all regulations under 18 AAC 60.810 and 18 AAC 60.820-860, respectively.

Water monitoring is when samples are collected from water bodies or groundwater in or near the landfill to verify if the landfill is affecting water quality. If it is required at a landfill, the requirement will be included in the permit and will be guided by a monitoring plan approved by ADEC. Water monitoring can also be done on a voluntary basis.

Types:



There are two types of water monitoring at landfills: surface water and groundwater. Surface water is defined as water open to the atmosphere and subject to run-off. This includes water bodies such as streams, rivers, lakes, ponds, wetlands, etc., and also includes springs, wells, or other collectors directly influenced by surface water. Groundwater is the water below the land surface in the zone of saturation and is the source of water in drinking water wells.

When is monitoring required?

Monitoring of surface water or groundwater is generally not required at Class III landfills. However, it can be required if there is evidence the landfill is impacting either surface water or groundwater. If a landfill is located in a Drinking Water Protection Area, water monitoring may be required. Currently, only a few Class III landfills are required to perform water monitoring, and a few more have chosen to voluntarily perform water monitoring due to community concerns or other reasons. Whether a landfill is required to monitor or chooses to monitor, the facility must follow the applicable regulations. Contact your Rural Landfill Specialist for assistance.

How can landfill water monitoring be set up?

- The solid waste regulations require water monitoring if the owner or operator has knowledge that the facility is contaminating groundwater or surface water. This means that before committing to monitoring, it is important to consider whether it is necessary and what will be done if the landfill is found to be contaminating groundwater or surface water.
- Determine the reasons for sampling and what to do with the data. There are many different constituents for which water can be tested. Decide which types of sampling will be most useful and if they fit within the budget.
- Call your ADEC Rural Landfill Specialist or the ADEC landfill monitoring contact (907-269-1099) for guidance prior to any sampling.

- Contact a certified lab. They can provide guidance on how to pack and submit samples. The lab also usually provides instructions in the sampling cooler for how to collect and preserve the samples correctly.
- Poorly collected samples are not useful, and retesting is costly, so if at all possible, get a qualified sampler. In some communities the water or wastewater treatment plant operators may be trained to sample properly.
- Sampling groundwater can be costly since it will require the installation of monitoring wells, which require drilling similar to drinking water wells.

5.0 Special Waste Management

Special wastes are wastes that typically require special handling, storage, and often diversion through special processing or backhaul. Special wastes are not typical household garbage and need to be handled separately. In many cases, these wastes also pose a greater risk to human health and the environment than household garbage.

5.1 Petroleum Polluted Soil

Class III landfills are not required to accept polluted soil even if the request meets all the regulatory requirements.

This section only discusses the requirements for accepting petroleum polluted soil from a small spill within the community. To accept polluted soil from a larger spill or from soil that is contaminated with anything other than petroleum, contact your Rural Landfill Specialist for options.

A request for disposal must be signed by both the landfill permittee and the generator of the polluted soil, and must include the applicable laboratory data report(s). An approval letter from the ADEC Solid Waste Program must have been obtained prior to accepting polluted soil at the landfill.

What is petroleum polluted soil?

Petroleum polluted soil is soil impacted by fuel that either spilled onto the ground or that leaked from an above ground or underground storage tank.

What should the landfill operator think about before accepting polluted soil?

Polluted soil is a special waste and no landfill is required to accept it. In fact, there are many factors to consider prior to agreeing to accept any polluted soil.

Understand the risks

- Polluted soil is not just dirt. It is soil that has been deemed too contaminated to stay in place, and placing it into a landfill does not eliminate the risks.
- Once the polluted soil is accepted at the landfill, the landfill owner then becomes responsible for the soil. If the soil at the landfill contaminates the surrounding environment, the landfill owner is responsible. This responsibility includes all the financial costs to clean up the contamination.

Does the landfill have good access control?

- If the landfill is a self-haul facility or has no access controls, access to the polluted soil disposal area will need to be controlled to protect the landfill users. Some components of fuel are known to cause cancer and other diseases, so it is important to limit exposure.

Does the landfill have the equipment to handle it?

- A cubic yard may not seem like much soil, but one cubic yard weighs about 2000 lbs and will fill approximately 203 one-gallon buckets.
- If the landfill does not have heavy equipment to move and handle polluted soil, then it will be difficult to properly manage.
- Before agreeing to accept polluted soil consider how much can be easily managed with the equipment available at the landfill.

Does the landfill have the capacity?

- 500 cubic yards of soil will provide approximately six inches of cover to $\frac{1}{2}$ acre or about half a football field.
- Before agreeing to accept polluted soil, consider how much space is available at the landfill. Landfills are expensive, so the space in the landfill is valuable. Polluted soil takes up valuable space that may be needed for other wastes and can easily fill up and overwhelm a small landfill.

Can the responsible party help?

- If heavy equipment is unavailable, consider asking the responsible party (the person disposing of the polluted soil) to help place and manage the soil in the landfill.
- The responsible party often has heavy equipment and thus can spread the soil in the landfill or help consolidate and compact other waste in exchange for the landfill accepting the polluted soil.

Do you have approval?

- An approval for accepting polluted soil at the landfill comes in the form of an official letter from the assigned landfill specialist from the ADEC Solid Waste Program.
- There are other forms associated with polluted soil that people think of as an approval for disposal. However, without direct communication with the Solid Waste Program, the soil is not approved for disposal in the landfill.

What are the regulatory requirements for accepting polluted soil under 18 AAC 60.025(b)?

- The landfill must be permitted.
- The polluted soil must originate from the cleanup of a single spill incident (not consolidated from multiple sites) within the community served by the Class III landfill.
- The volume of polluted soil is less than 500 cubic yards.
- The soil contains only petroleum hydrocarbons at concentrations that do not exceed the following maximum concentrations (as confirmed by laboratory testing results submitted with the disposal request):
 - Gasoline-Range Organics (GRO) – 900 mg/kg
 - Diesel-Range Organics (DRO) – 2,000 mg/kg
 - Residual-Range Organics (RRO) – 4,500 mg/kg

Other options for polluted soil:

Other options for handling polluted soil include landfarming to remediate the soil locally, or shipping it out to another facility for treatment or disposal.

Helpful tips:

- Contaminants in polluted soil can result in long term pollution and have long term negative human and environmental health effects. ADEC will only allow disposal if it is clear that the contaminants in the polluted soil are not likely to migrate to groundwater or surface water.

Examples:

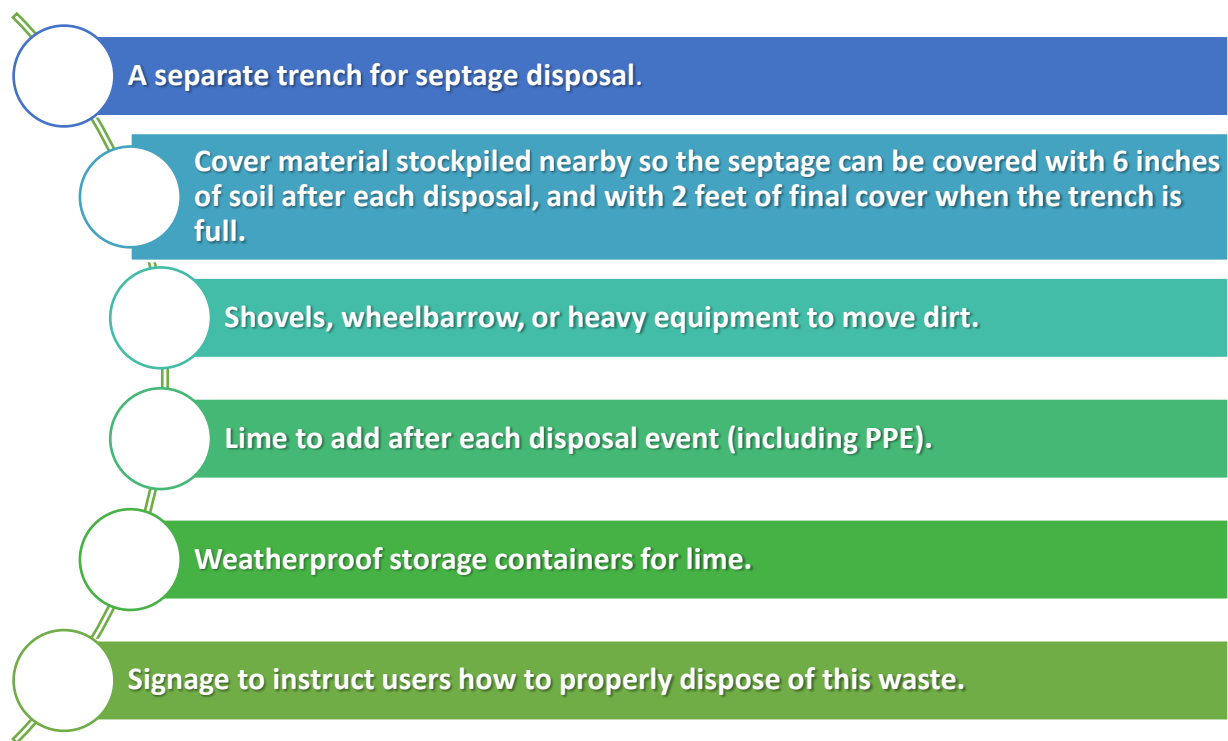


Polluted soil used to help close out a section of the landfill.

5.2 Septage Waste

The landfill may accept septage waste if the landfill is permitted for this waste, the waste is deposited into a designated trench or bermed area that meets required standards, and the waste is maintained so that it doesn't overflow. Hydrated lime must be added to achieve a pH of 12 for 30 minutes after each disposal (18 AAC 60.365). Septage has specific geology requirements for drainage. These are not appropriate for above ground landfills with poor geology or high groundwater tables. If these conditions are present, a Wastewater utility should be utilized to manage septage in a sanitary manner.

Requirements for good management of septage waste at the landfill:



Why are these important?

- **Separate trench:** Ideally, the septage trench should be located in a separate area with its own fencing and signage in the landfill. This area is only used during episodic pumping events, so this reduces the possibility of exposure to potential diseases from contact with exposed septage. It also makes it easier to cover and manage the waste.
- **Cover material:** A minimum of 6 inches of cover material added to the waste that is sufficiently solid will help to control odors.
- **Hydrated lime:** Lime is a powdered substance that kills the bacteria and reduces the smell associated with septage waste.

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- Weatherproof container: Lime needs to be kept dry until application for it to be effective. Storing it in a weatherproof container near the septage area will keep it dry and promote regular use.
- Signage: Giving directions for how and where to dispose of septage waste will reduce the risk to landfill users.



Septage trench with lime added.

Helpful Tips:

- If possible, instead of a designated trench in the landfill, construct a separate lagoon outside of the landfill for septage waste. This will be managed by the ADEC Wastewater Program.
- A minimum of 4 feet between the bottom of the designated septage trench and the seasonally high groundwater is required.
- The trench should be dug in soil that drains easily, such as sandy soil, so that liquids put into the trench will soak into the soil. Consult the ADEC Solid Waste Program for specific specifications of how trenches should be constructed.
- Lime should be added by the operator to the septage waste at a rate of approximately 25 pounds of lime for every 1,000 pounds of septage waste or approximately 2 cups of lime for every 5 gallons of septage waste.

Lime – Which one is the right one?

The correct type of lime to use in a septage trench is a lime that sanitizes. The two types of lime that sanitize are calcium oxide (commonly called quicklime) and calcium hydroxide (also known as hydrated lime). Either of these lime types, when mixed with the moisture within the septage waste, will generate a high pH (alkaline) solution. It is this high pH that kills microorganisms. Again, the correct forms of lime to use are “*quicklime*” or “*hydrated lime*.” Quicklime is the best, but it can be very expensive and difficult to obtain in Alaska, so hydrated lime may be the more practical option.

DO NOT USE calcium carbonate. This is another form of lime that will not sanitize and thus is not useful for a septage disposal trench. Another common form of lime that does not sanitize is Aglime (garden lime), which contains calcium carbonate and magnesium carbonate.

Where to purchase hydrated or quicklime?

Option #1	Option #2	Option #3
• Ask a local store to order some.	• Ask the local or regional corporation.	• Order online.

Personal Protective Equipment (PPE): When handling lime be sure to use any appropriate PPE recommended by the manufacturer. This often includes gloves, eye protection, and a mask to prevent inhalation.



Seepage trench.

Sewage Solids

The landfill may accept sewage solids if the landfill is permitted for this waste, the waste is adequately dewatered, the waste is not hazardous, and the waste is maintained so that it doesn't attract vectors for diseases and does not provide a habitat for pathogen growth. Sewage solids disposal at Class III rural solid waste facilities is not a ubiquitous practice across the state of Alaska, please consult ADEC Solid Waste Program staff with questions about proper management.

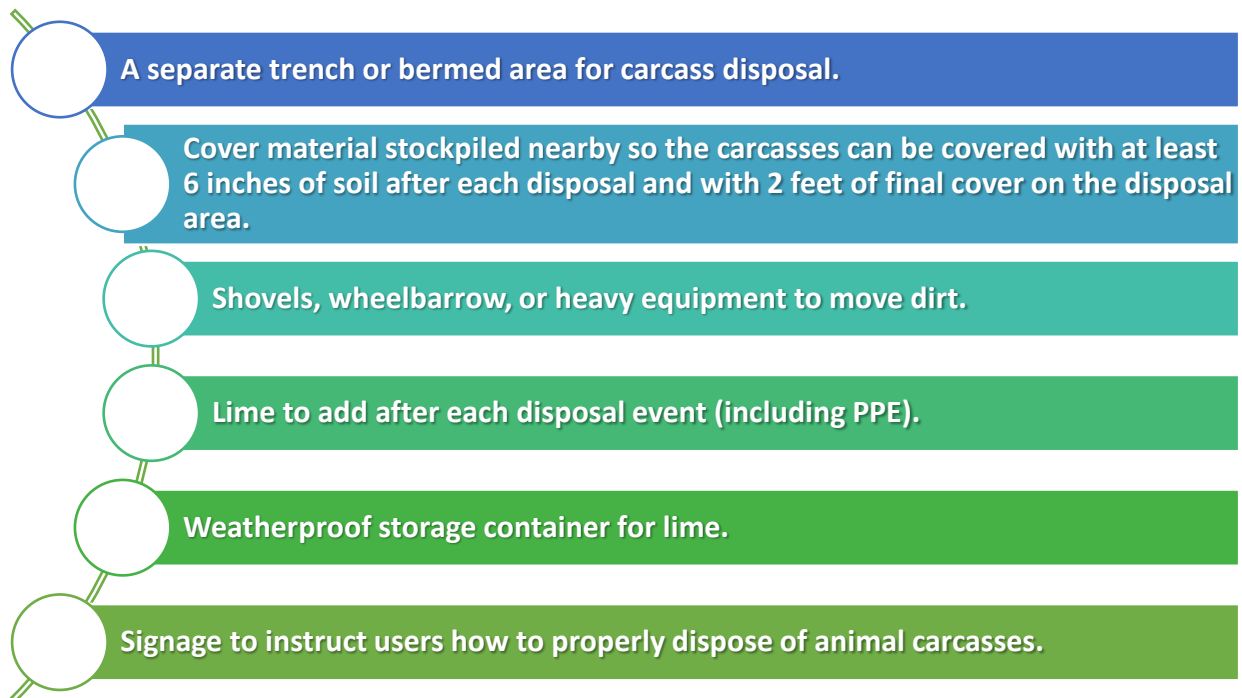
Sewage solids differ from septage as they must have been dewatered to no less than 10% solids by weight. Some communities conduct bulk disposal events of sewage solids from the wastewater treatment plant in the landfill. This practice requires regular analytical sampling and will require approval from ADEC.

5.3 Animal Carcasses

Animal carcasses must be disposed of in a manner that does not cause an animal attraction and protects public health. (18 AAC 60.010)

Animal carcasses should never be disposed of in the same location as other waste or mixed with household trash, as this greatly increases the chances of germs from the animal carcasses being tracked back to the community by vehicles or people. For safety, it is best to place animal carcasses in a separate disposal trench or bermed area.

Requirements for good management of animal carcass disposal at the landfill:



Why are these items important?

- Dedicated trench or area: Reduces public contact with the waste and reduces the risk of carrying germs back to the community.
- Cover material: Putting at least 6 inches of cover material over the carcass limits scavenging (by birds, bears, foxes, dogs, etc.) and prevents flies from laying eggs in the carcasses.
- Lime: Lime is a powdered substance that reduces the smell associated with dead animals and helps the carcass decay faster.

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- Weatherproof container: In order for the lime to stay effective, it needs to remain dry before being applied to the carcass.
- Shovel: This is needed to apply cover and lime to the animal carcasses or subsistence wastes.
- Signage: Giving people directions for how and where to dispose of a carcass will reduce risk to landfill users. Signs can be written in the local language to help with understanding and compliance.



Properly signage at an animal carcass disposal pit.

Helpful Tips:

- If groundwater is near the surface in the region or a trench can't be dug, berms may be built to create an above ground carcass pit.
- A seasonal subsistence carcass trench or above ground bermed disposal area outside the landfill may be an option during hunting season. After hunting season is over, the area can be closed and covered with a minimum of 2 feet of soil.
- Heads, hides, and lower legs of carcasses also attract animals, so they should also be disposed of in the designated animal carcass disposal area.
- A dog cemetery can be established outside of the landfill or the dogs can be added to the designated carcass disposal area. However, the disposal must still be managed with lime and proper application of cover.
- Fish waste can be returned to the river or ocean rather than being disposed of at the landfill. Be sure to follow any guidance or regulations provided by the Alaska Department of Fish and Game.
- Field dressing the harvested animal is also an acceptable disposal option.



Animal carcass pit.

- A light dusting of lime is all that is needed to sanitize the carcass.
- Outreach and education play an important role in gaining acceptance by the public. Explaining why it is important to dispose of animal carcasses in the appropriate area may improve the public's willingness to dispose of carcasses properly.

Lime – Which one is the right one?

The correct type of lime to use in a carcass pit is a lime that sanitizes. The two types of lime that sanitize are calcium oxide (commonly called quicklime) and calcium hydroxide (also known as hydrated lime). Either of these lime types, when mixed with the moisture within the carcass, will generate a high pH (alkaline) solution. It is this high pH that kills microorganisms. Again, the correct forms of lime to use are “*quicklime*” or “*hydrated lime*.” Quicklime is the best, but it can be very expensive and difficult to obtain in Alaska, so hydrated lime may be the more practical option.

DO NOT USE calcium carbonate. This is another form of lime that will not sanitize and thus is not useful for landfill use. Another common form of lime that does not sanitize is Aglime (garden lime), which contains calcium carbonate and magnesium carbonate.

Where to purchase hydrated or quicklime?

Option #1	Option #2	Option #3
• Ask a local store to order some.	• Ask the local or regional corporation.	• Order online.

Personal Protective Equipment (PPE): When handling lime be sure to use any appropriate PPE recommended by the manufacturer. This often includes gloves, eye protection, and a mask to prevent inhalation.

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Examples:



Above ground animal carcass disposal area.



Sign instructing people how to dispose of animal carcasses.

5.4 Household Hazardous Waste

Keeping household hazardous waste out of the landfill helps to keep chemicals out of the landfill and reduces the risk to human health and the environment. Household hazardous waste can be reused within the community or shipped out for proper disposal.

What is Household Hazardous Waste?

Household hazardous waste (HHW) is generated by households and consists of household products that contain hazardous substances. Examples include lead-acid batteries, fluorescent bulbs, solvents, paints, cleaners, pesticides, etc. Since these wastes were generated by a household, they are exempt from being regulated as a hazardous waste.

The same wastes generated by businesses or schools do not qualify as HHW, and those entities are responsible for properly managing these items as hazardous wastes. Businesses and schools cannot dispose of hazardous waste in a Class III landfill.



Sign informing disposers that this collection shed is not for contractors or large organizations.

ADEC strongly recommends that HHW is separated out for reuse or backhaul to protect human health, the environment, and subsistence resources. Although HHW is not regulated as hazardous waste, separating HHW from the waste disposed of at the landfill will help keep chemicals out of the landfill and reduce risks to human health and the environment. HHW can be reused within the community or shipped out for proper disposal or recycling.

Proper management of HHW:

The following will help to ensure that HHW is responsibly managed and prepared for reuse in or backhaul from the community:

- Don't accept any hazardous waste from local projects, businesses, governments or other organizations. The contractor/entity is responsible for backhauling any hazardous waste generated by the project or organization, regardless of the amount. It is the landfill permit owner's legal right to refuse to accept any waste at any time.
- If the container doesn't have a label, then manage it in accordance with the Mystery Drum section below.
- If it is not clear whether the product or ingredient is hazardous, look up the product/ingredient on the Agency for Toxic Substances and Disease Registry (ATSDR) website or check the manufacturer's SDS (safety data sheet) for additional details

including testing for toxicity.

Storing HHW:

The storage of HHW should comply with the following guidelines:

- Separate different types of household hazardous wastes.
- Keep the products in their original containers if possible and don't mix any products together.
- Label and date (day of receipt) all containers to the best of your knowledge.
- HHW should be stored off the ground, in containers, under cover, and out of the weather. Rain and snow melt will overflow buckets/barrels and can rust out metal containers and cause leaks.
- If a container is beginning to rust or leak, place that container into another sturdy container to catch the leaks. Be sure to label the new container.
- Make sure lids and caps are sealed tightly.
- Keep hazardous wastes away from heat, flames, sparks, or other sources of ignition.
- If items are reusable or are considered salvageable, keep them from freezing. Once frozen, many items, including paints, solvents, glues, and lead-acid batteries, are no longer usable. Freezing also has the potential to break the container open, causing leaks in the spring.
- Do not store HHW near the barge landing, river, or coastline. In the event of a flood or storm surge, the containers may be carried away.

Reuse options:

A reuse building or area is a great way to re-purpose HHW that is still usable. Reuse allows someone else to use the material for its intended purpose, saves money on backhaul, and prevents HHW from being disposed of in the landfill. A reuse center is not an HHW collection site. All the products in a reuse center should cycle through. Items that are not used within a couple of months need to be moved to the collection center for storage and backhaul.

It is important to note that not all materials can be reused. To be reused the material must be in good usable condition, have enough material left to use, in its original container, not expired, safe to use, and must be used according to the directions on the label.



HHW reuse center. Items are grouped by type and regularly removed if not claimed.

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A reuse center should:

- Be available to residents.
- Keep items properly separated.
- Be weatherproof.

Backhaul:

Backhaul is necessary for any HHW that cannot be reused or that hasn't cycled through the reuse center. Some considerations for backhaul include:

- Ship HHW out of the community annually. Don't let the stockpile become larger than what you can safely manage.
- Some pesticides, lead-acid batteries, and fluorescent light bulbs can be shipped out as universal waste, which is less complicated and more cost effective.
- Some items, such as lead-acid batteries, have value and can be sold to recyclers.
- See the backhaul section of this manual for more information regarding backhaul tips and procedures.

Helpful tips:

- Do NOT burn any HHW.
- An option for unused latex paint is to open the container and let the paint dry to a solid. Once the paint has solidified completely, the container can be disposed of in the landfill.

Examples:



HHW collection shed that is clean and well organized. The different collection areas are labelled, and wastes are separated.

5.5 Liquid Waste

Examples of liquid waste include used oil or fish oil from processing plants. Liquid products of a gallon or more cannot be disposed of in the landfill. (18 AAC 60.360)

If the liquid is a household hazardous waste, such as drain cleaner, it cannot be disposed of in the landfill in any quantity.

What is liquid waste?

There are a few ways to determine if a waste is considered a liquid waste:

If the waste can be poured out of a container at room temperature, it is probably liquid waste.

If puddles or pooled liquid are visible in the container of waste, it is probably a liquid waste.

Use the paint filter test – place some of the material in a paint filter or coffee filter for 5 minutes. If any liquid drips through, it is considered a liquid waste.

How to inform the community about liquid waste disposal restrictions:

Create an outreach program to let the residents, stores, schools, etc. know that liquid products of a gallon or more cannot be disposed of in the landfill.

Ideally, the community should have a collection and/or reuse program for these items. The reuse program should have a way to ensure that the items stay warm so that they do not freeze, making them unusable for reuse.



Common sources of liquid waste.

Other resources:

See the household hazardous waste section and used oil sections of the manual.

5.6 Construction & Demolition Debris

Class III landfills are not required to accept construction and demolition (C&D) debris, even from projects that benefit the community, such as water/sewer projects, schools, or housing improvement projects.

C&D is regulated based on local laws and ordinances. However, before any C&D debris is accepted at the landfill, the project contractor should submit a building survey showing that all hazardous wastes and asbestos-containing materials were removed prior to demolition.

What is C&D debris?

C&D debris is the waste material generated by anything from a home remodel to a full demolition of a building. In rural communities, the source is often construction, demolition, or renovation of community or commercial facilities and water/sewer systems. ADEC recommends only accepting C&D debris from local residential users and not from commercial projects.

What should be considered prior to accepting commercially generated C&D debris at the landfill?

Costs

- The disposal of C&D waste can have a significant cost to the community.
- This includes the costs of handling the debris, including the operator's time, equipment fuel and time, and the space the waste takes up in the landfill.

Landfill Capacity

- C&D debris is bulky and difficult to compact, so it takes up a large amount of landfill space and shortens the life of the landfill.
- Landfills are extremely expensive to replace, so it is important to use the space responsibly to ensure a long-term disposal option for the community.

Design

- A landfill's design alters how C&D debris is handled.

Equipment

- C&D debris is bulky and difficult to compact. It cannot be managed by hand or with a small skidsteer. Larger equipment is needed to place, compact, and cover this waste.
- If the landfill does not have the proper equipment, the generator may have the equipment needed to place, compact, and cover the waste.
- If the contractor is volunteering use of equipment, be sure the work is completed before the contractor leaves the community

Personnel

- To ensure proper handling and sorting, the landfill operator should have training on C&D debris management before any of this waste is accepted at the landfill.
- If the contractor is hauling the C&D to the landfill, the operator should be present during waste disposal to sort the loads to ensure that there are no prohibited materials present such as liquid paint, solvents, or hazardous wastes.

Hazardous Materials

- Hazardous materials in buildings can include mercury thermostats, exit signs, asbestos, lead based paint, and fluorescent lights.
- A hazardous building materials assessment AND a building demolition notification to EPA are required.

If the landfill does not have enough space, the necessary heavy equipment, or available cover material at the landfill for proper disposal of C&D debris, it is important to work out ahead of time whether the waste generator can help with the disposal. If the generator cannot help, do not accept it. Remember: it is the generator's responsibility to properly dispose of the waste. If the operator accepts the waste, it becomes the operator's responsibility.

How C&D debris is regulated in rural communities:

- The landfill must be permitted to legally accept C&D debris.
- Acceptance policies for C&D debris can be established in local laws and ordinances. Communities should consider enacting an ordinance that clearly defines the fees for accepting C&D debris and any other rules for disposal of this waste.



C&D debris staged for backhaul in the community.

Helpful Tips:

- Waste disposal options should be discussed with the funding agency when a community project is being planned so that the disposal requirements for the project are appropriately addressed in the contract and bid documents.
- Materials that are salvageable should be sorted out prior to being transported to the landfill so they can be staged for safe salvaging by the public.
- Nails can pop tires, so C&D debris should be kept away from access roads in the landfill.
- Accepting C&D debris from a project is not an all-or-nothing decision. If the landfill can only handle part of the waste, that is OK. Only accept what you can properly manage.
- Sharing information about how and when to transport waste with contractors will help remove the waste from the community.
- Consider setting rules for contractors on how waste must be delivered or required the C&D debris to be pre-processed to a certain size, length, or set dimension to make it easier to handle.

Examples:



C&D debris disposed of in a trench-and-fill landfill.

5.7 Salvage Area

Salvage areas are not a required component of Class III landfills. If a salvage area is set up at the landfill, then be sure it is safe for the public and can be managed with current staffing hours. The salvage area must be limited to an area that does not hinder facility operation, create a safety hazard, or cause pollution. (18 AAC 60.220)

What you need to have a successful salvage area:

Plan

- Decide what will be accepted.
- Organize the space for the type of items accepted.
- Include the management strategy of the salvage area in the landfill operations plan.

Separate Area

- A salvage area should be separate from the active disposal areas.

Signs

- Signs to indicate where to put each type of item.

Where will the salvage area be located?

A salvage area can be located in a variety of places. It can be outside the landfill so people can salvage items even when the landfill is closed. Or it can be inside the landfill so the operator has more control over the area and can easily move items that no longer contain salvageable material to the active working face.



Salvage signs outlining acceptable items. Photo Credit: Peter Olson, Golovin Landfill Operator and Public Works Director

The ideal location of the salvage area at the landfill is dependent on how the community handles waste. If the community struggles with placing waste in the appropriate disposal area, then a salvage area inside the landfill may be the best option. If the community is good at self-regulating waste disposal, then a more accessible salvage area may be appropriate.

What salvageable materials will the landfill accept?

You need to consider what salvageable materials will be staged at the landfill. Only good, usable items should be accepted for salvage. Unsalvageable items or junk should be disposed of.

Examples of good, usable items include:

- Windows, doors, and other reusable building products and materials
- White goods and appliances for salvageable parts
- Furniture
- Tools
- Fishing gear
- Vehicles/parts

No matter what item is being accepted for salvage, the landfill should have a designated, safe, organized space for that item. Vehicles should be stored in a designated vehicle salvage area after the removal of fluids and batteries, white goods should be placed with other white goods, etc. Avoid mixing the different categories of salvageable material to avoid having an unmanageable salvage area.

Vehicles:

Vehicles (cars, trucks, ATVs, snowmachines, etc.) are the most commonly salvaged items. However, they require some special considerations prior to being placed in the salvage area. (See Vehicles section for more information)



Snowmachines staged for salvage.

Appliances:

Some appliances (refrigerators and freezers) require special considerations prior to being placed in the salvage area. Prior to accepting refrigerators or freezers for salvage (or disposal) the freon (CFCs) must be removed by a trained operator (See Freezers & Refrigerators & CFCs section).

Safety Tips

- Line up items on the ground so people don't have to climb a stack when salvaging parts.
- Adequate space should also be allotted between items so they can safely be accessed and maneuvered during salvaging.
- Hydraulics can fail! Don't rely on your heavy equipment hydraulics to hold up a vehicle while it is being processed.



Vehicles staged for salvage.

Things don't last forever:

Salvageable items don't last forever. Once an item has been damaged, weathered, deemed junk, or all of the useful parts have been salvaged, the item should be moved to the active disposal area, placed in the scrap metal pile, or staged in the appropriate backhaul area (if applicable).

Be sure to have a timeline for how long items will sit in the salvage area before being moved to the appropriate disposal or backhaul area.

Reuse store/household goods salvage area:

Household goods, electronics, and other small items are best staged in an enclosed dry area such as a shed or conex box. The area should also be organized and regularly cleaned out to ensure that nothing stays in the salvage area too long.

For more information on setting up an indoor reuse store or household good salvage area, contact your ADEC Rural Landfill Specialist.

Other helpful tips:

Salvage areas need to be maintained just like the rest of the landfill.

Before implementing a salvage area, make sure the landfill operator has time to manage it.

Salvage works best in landfills with an operator and restricted access.

Trash attracts trash: Keep the salvage area clean and organized.

5.8 Used Oil

Separating out used oil from other wastes disposed of at the landfill will help keep petroleum products out of the landfill and the environment.

What is used oil?

“Used oil” is any petroleum-based or synthetic oil that has been used for its intended purpose and is now contaminated with physical or chemical impurities.

How to manage used oil:

- Used oil should be collected and safely stored in a designated area instead of being disposed of in the landfill. The designated area should not be at the landfill.
- Once collected, the used oil can be burned for heat (energy recovery) or backhauled.

Storing used oil:

- Used oil should be stored off of the ground, in containers, and preferably covered so rain doesn't enter the containers.
- Used oil should be stored in secondary containment. This means the container of oil is placed into a container or an area designed or intended to contain any leaks or spills from the container. Spills and leaks can create a contaminated site that is expensive to clean up.



Storage drums for use oil.

Helpful tips:

- Smart Ash burners are not designed to burn straight used oil. A separate “oil away” attachment is designed to drip feed the oil into the unit while burning other items such as oily rags and absorbents.
- Used oil burners using locally-generated used oil can produce heat for non-residential structures like a shop building or garage. However, these burners require regular maintenance, and the oil often needs extra filtration to keep from plugging up the nozzle.

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- Used oil should not be used for starting the fire in the burn unit at the landfill as it will create a large amount of black smoke which is an Air Quality violation. The black smoke is what carries contamination outside of the landfill and into the community and the local environment.

Examples:

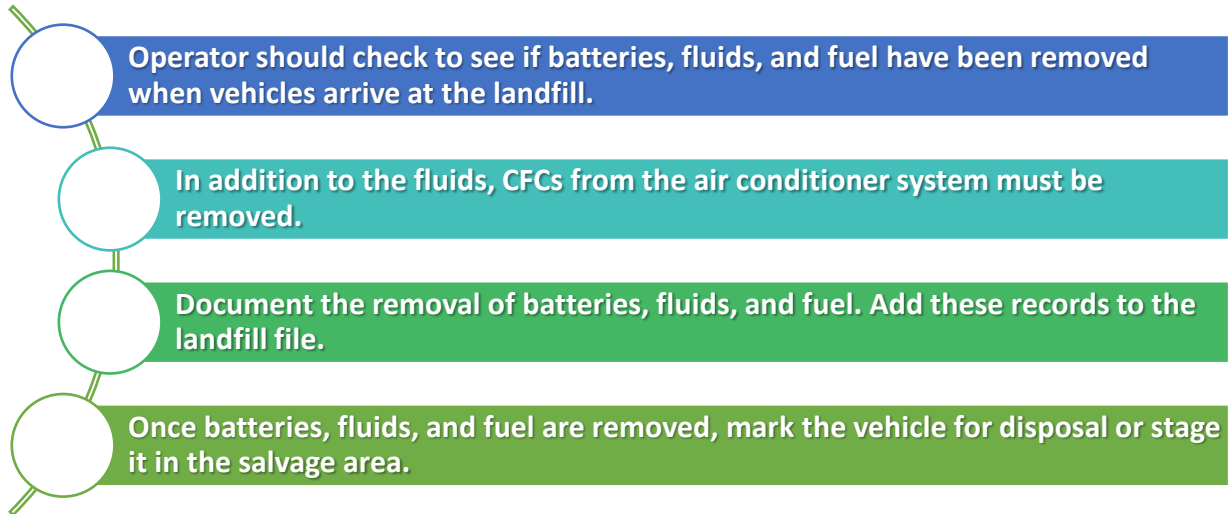


EPA approved used oil burner for energy recovery to heat community building.

5.9 Vehicles

Vehicles can be disposed of at the landfill once all fluids, batteries, mercury switches, and CFCs have been removed. If undrained vehicles are stored at the landfill for disposal or recycling, they must be managed to prevent the release of fluids. (18 AAC 60.035, 18 AAC 60.010)

Steps for junk vehicle management:



What fluids to remove:

Removing all fluids includes draining the:

- Engine oil
- Transmission fluid
- Anti-freeze
- Differential or gear oil
- Power steering fluid
- Fuel
- Brake fluid
- Clutch fluid



Vehicles crushed and staged for backhaul or disposal.

Fluids should be put into containers and handled along with HHW collection. Failure to remove fluids and CFCs can result in leaks which can cause contamination.

How to remove fluids:

There are two main ways to remove the fluids from junk vehicles. The car can be placed on an appropriate lift and the fluids drained, or a portable suction hand pump and canister can be

used, such as a Mighty Vac designed to pump fluids out of the vehicle. The suction hand pump and canister have the advantage of eliminating the need to crawl under the vehicle to remove fluids.

Uses for junk vehicles (once fluids are removed):

- Station them end-to-end to block access into closed areas at the landfill.
- Incorporate them into berms at the landfill.
- Use them to separate disposal areas at the landfill.
- If heavy equipment is available, the vehicles can be stacked to create a windbreak to prevent windblown litter.



Vehicle marked empty prior to disposal.

Backhaul?

Once the batteries, fluids, fuel, and CFCs have been removed, the vehicle can be backhauled for recycling or crushed and disposed of in the landfill. Junk vehicles have little risk of environmental contamination if handled properly. If backhaul funds are limited, the most environmentally friendly option is to backhaul household hazardous waste before vehicles. If vehicles will not be backhauled within three years, they should be disposed of in the landfill. Don't leave vehicles sitting staged for backhaul or salvage for years.

Helpful Tips:

- Don't mix fluids! If antifreeze, used oil, and transmission fluid are mixed together in a barrel, the mixture is non-recyclable. This means it must be shipped as hazardous waste, which is very expensive.
- If the landfill does not have the space or the funds to handle junk vehicles, they can be prohibited from disposal at the landfill, or the landfill can charge a disposal fee to cover the costs (fluid removal, crushing, backhaul, etc.)
- If staging vehicles, four-wheelers, and snow machines for salvage, there is a limited amount of time the parts are viable for salvage. At some point the vehicle will need to



Vehicles used as a berm to mark the edge of the working face.

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be removed from the salvage area and properly disposed of.

- Some common vehicle parts, such as alternators, radiators, catalytic converters, etc., may have salvage value and can be sold to recyclers.

Examples:



ATVs segregated from the rest of the waste.



Junk vehicles staged for salvage.

5.10 Freezers & Refrigerators & CFCs

Chlorofluorocarbons (CFCs) comprise the gas (also known as Freon) used in the heat transfer system in appliances and must be removed by a technician with certified equipment prior to disposal at the landfill (40 CFR 81.154-162). CFCs released to the environment damage the ozone layer in our planet's atmosphere.

Steps for Freezer and Refrigerator Management:

Before accepting appliances for disposal check for food and CFCs (Freon)

- Freezers are often full of food when they fail and they are not always cleaned out prior to disposal. This leaves the operator with a freezer full of rotten food to deal with.
- By having the owner remove the doors prior to bringing it to the landfill, the operator can verify that no food has been left in the unit. Most recyclers require this as a safeguard.

Segregate the refrigerators and freezers in the landfill

- Segregating the freezers and refrigerators from other waste reduces the likelihood of gas lines being punctured and releasing CFCs into the environment.
- Store the appliances in an upright position with space behind the appliance to facilitate CFC removal.

Remove the CFCs

- CFCs must be removed by a certified technician with certified equipment.
- The landfill operator needs to document when CFCs are removed.

Mark the appliance once CFCs have been removed

- Once the CFCs are removed make a clear mark such as a spray painted X on the appliance so it is easy to identify which appliances are ready for disposal or backhaul.

Disposal or backhaul

- With CFCs removed the appliances can be crushed and buried *OR* staged for eventual backhaul.

Backhaul

Appliances have little to no value to recyclers. Once the CFCs are removed, appliances are essentially scrap metal, so the backhaul of appliances should be considered a low priority. Household hazardous waste should be backhauled before appliances. If appliances have been sitting around for more than two years waiting for backhaul, they should be disposed of in the landfill.

Helpful Tips:

- Refrigerator and freezer doors are great for making signs at the landfill to direct users where to dispose of trash, to designate disposal areas for different waste streams, or to communicate any other important information about the landfill.
- Keep in mind that if appliances such as refrigerators and freezers are crushed, foam and plastic from inside the unit will be everywhere. Crush these items close to where they will be disposed to limit the spread of litter.



Freezers with the doors removed. To keep them from filling with water they should be stored open side down or in a covered area.

Examples:



Refrigerator marked after the CFCs have been removed.



Refrigerators and freezers segregated from the rest of the waste.

5.11 Lead-Acid Batteries

Lead-acid batteries are hazardous waste and are not allowed for disposal in the landfill. Prohibiting the disposal of lead-acid batteries in the landfill reduces the risks of environmental contamination from the lead. Batteries should be stored in a lined, covered container or area, and managed to prevent any release to the environment until they are shipped out of the community for recycling.

List of things you need for good management of lead acid batteries:

- 1 Totes or covered storage area with pallets.
- 2 Absorbent material.
- 3 Banding for shipping.
- 4 Shipping wrap for shipping.
- 5 Layering material for shipping.

Why are these things important?

- Using totes or a covered storage area with pallets is important to keep batteries dry and off the ground. When using totes, it is important that the lids stay on, so they don't fill with water while batteries are being collected in them.
- Absorbent materials such as vermiculite or cat litter should be placed in the bottom of the totes to absorb any leaking battery acid.
- Banding allows the tote or the batteries to be secured to the pallet, so that nothing shifts during transportation.
- Shipping wrap can stabilize the batteries and help contain them when stacked on pallets.
- Layering material for shipping, such as multiple layers of cardboard, "waffle" or "honeycomb" cardboard, or sheets of foam, should be used between layers of batteries.



Covered storage shed for lead acid batteries.

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This material helps support the weight of the stacked batteries so that all the weight is not solely on the battery terminals, which may cause the batteries at the bottom of the stack to break and leak.



Tote packed and banded for transport.

Helpful Tips:

- Have separate totes for leaking/broken batteries and non-leaking/intact lead acid batteries. This keeps the leaking batteries from contaminating the intact batteries.
- Keep the lids on totes that are stored outside. Otherwise, it creates a tote of battery acid “soup” as the tote collects rain and snow melt.
- Collect and store batteries in the method in which they will be shipped, whether in a tote, on a pallet, in an action packer, etc.
 - This will save time and will ensure that the batteries will only need to be handled once when packaging for shipment.
 - This method allows for an easy inventory, and a determination of how much storage space is available before a backhaul event needs to be arranged.
- Make sure the liquid from leaking batteries cannot enter the soil or nearby water.
- If shipping batteries in a fish tote, be sure to arrange for return shipping of the tote. Totes can be difficult to obtain and should be returned to the community for future use.
- When shipping batteries, be sure to have a way to track weight. A tote/pallet that has two complete layers of batteries is often heavier than most planes will transport. Be sure that the heavy equipment and the air carrier can handle the tote/pallet before banding it.
- It's recommended to take backhaul training to learn how to properly package and ship batteries.
- Contact a recycler for more information on what is required for backhaul staging and



Batteries stored in layers.

shipping information.

- Contact the Department of Transportation (DOT) at 1-800-467-4922 for assistance with the requirements for shipping batteries.

What not to do:

- Batteries should never be burned or left outside in the rain or snow.
- Batteries left out over winter will freeze, split, and leak, especially if the batteries are in direct contact with the ground.
- Do not ship batteries without using containment bags or another DOT approved container.

Personal Protective Equipment (PPE): When handling lead-acid batteries, be sure to use appropriate PPE. This includes eye protection, acid-resistant gloves, and splash resistant clothing.

Examples:



Lid on a fish tote so that water doesn't enter the tote.

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Batteries being collected and staged on pallets in a building.



Totes for batteries staged near the HHW collection shed.



Batteries being placed in a tote with absorbent material.

5.12 Mystery Drums

“Mystery drums” are buckets, barrels, or other containers with no labeling to identify the substance they contain. Mystery drums are harder to deal with than known wastes, but they are not impossible to address. Mystery drums should be a priority for identification and backhaul if needed.

How to deal with mystery drums:



Tips for avoiding mystery drums:

- Don't mix fluids together.
- Check for empty barrels. If there are empty barrels stored at the landfill, punch a hole in the side near the bottom or crush them so they don't collect fluids.
- Keeping an up-to-date inventory of household hazardous waste at the landfill and HHW reuse shed will allow the operator to quickly identify new items, so that if something unknown is dropped off, the responsible party is more likely to still be in the community.
- Do not store mystery drums near the barge landing, river, or coastline. In the event of a flood or storm surge, the containers may be carried away.

Examples:



Large collection of drums at the landfill. It is not clear which ones may have liquid and which ones do not contain liquid.



Large collection of unlabeled drums at the landfill. It is not clear which ones may have liquid and which ones do not contain liquid.

6.0 Administration

6.1 Permit

An ADEC Class III landfill permit is required for all Class III landfills in Alaska. (18 AAC 60.200, 18 AAC 60.235) The permit is valid for 5 years before it must be renewed. A copy of the permit and the permit application should be kept in the City or Tribal office, depending on which is the permit holder. Your Rural Landfill Specialist can provide assistance to make the initial permitting process and the permit renewal process very easy.

Permit application:

The permit application consists of three parts and each part is a separate form that must be completed before the permit can be issued. The three parts are:

1. Application form

2. Operations plan

3. Landowner documentation/consent

These forms can be found on the ADEC Solid Waste Program website (<http://dec.alaska.gov/eh/solid-waste>). ADEC staff are available to assist in filling out these forms, so contact your Rural Landfill Specialist for assistance. For communities with fewer than 50 people, there is a shorter, simplified permit application form.

While poor operations will not cause a permit to be denied, an inappropriate location (i.e. tundra pond landfill) can cause it to be denied. Contact ADEC to review the specific situation and determine what is needed to permit the landfill.

Application form:

The application form collects various information about the landfill. More information on those categories is provided below:

- Property information
 - A copy of the property deed can be found on the DNR Recorder's Office website.
 - Your Rural Landfill Specialist can assist by providing latitude and



The image shows a 'Class III Community Landfill Permit Application' form from the Alaska Department of Environmental Conservation, Solid Waste Program. The form includes a header with the department logo and title, a 'DEC Office Only' section for Landfill Name and Authorization #, and an 'Instructions' section. The main body is divided into 'Section 1: Property Information' and 'General Property Description'. Section 1 includes fields for Community Name, Population, Legal Property Description, Section, Township, Range, and Meridian. The General Property Description section includes fields for Address (if applicable), Latitude, and Longitude. There are also fields for Landowner and Contact Name, and a section for Attachments. The form is labeled 'Page 1 of 7' and 'DEC Form 1000-1'.

longitude coordinates for the landfill.

- Contact information
 - A good contact number and email address for the person filling out the application is needed.
- Environmental information
 - Prevailing wind direction from the landfill
 - Distances to airports, subsistence areas, buildings
 - The nearest drinking water source, river or lake, and surrounding wetland and permafrost areas
 - Annual precipitation information can be found online from weather websites
 - The types of soils that underlay the landfill can be identified by digging a few holes with a shovel or this information may be recorded in local sewage lagoon engineering plans or local drinking water well logs.
- Maps
 - An aerial photograph or map is needed, showing distances from the landfill to the nearest airport, home, drinking water source, and subsistence area.
 - This can be created by your Rural Landfill Specialist to be included in the landfill permit application.
- Landfill site plan
 - A good landfill site plan identifies areas that are filled with garbage and closed out, waste disposal areas that are currently in use, and space that is still available for future use.
 - Site plans can be hand drawn on a piece of paper and then updated as needed in the future.
- Agreements for closure and post-closure requirements
 - The landfill permit application outlines what actions are needed to safely close out the landfill when it is full.
 - If the landfill will not be closed within the next 5 years, the estimated closure cost only needs to be a reasonable estimate to guide future planning.
- Signature
 - The application needs to be signed and dated by someone with signing authority, whose eligibility to sign is defined in the application form.

Operations plan:

- See the Operations Plan section of the Operational Guidance.

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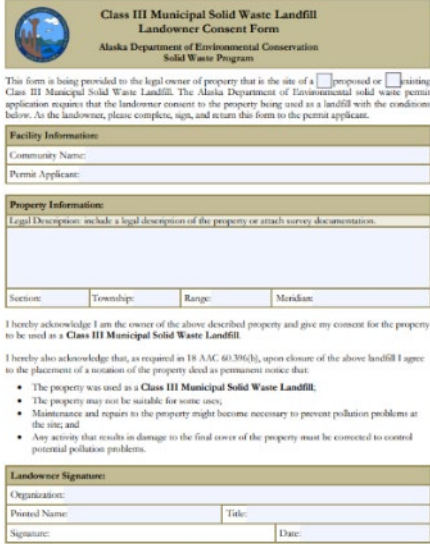
Landowner documentation:

- The ADEC permit application requires that the landowner consent to the property being used as a landfill.
- If the applicant is the landowner, all that is needed is a copy of the property deed identifying the applicant as the landowner.
- If the applicant is not the landowner, the application must include both a copy of the property deed and a landowner consent form signed by the landowner.

Class III renewal application:

The renewal application for Class III landfills is a simplified version of the first permit application.

The renewal application, and an updated operations plan, should be submitted to ADEC at least 30 days before the existing permit expires. ADEC staff are willing to help compile the renewal application, so contact your Rural Landfill Specialist for assistance.



The form is titled "Class III Municipal Solid Waste Landfill Landowner Consent Form" and is issued by the "Alaska Department of Environmental Conservation Solid Waste Program". It includes a header with a logo and a paragraph explaining the form's purpose: "This form is being provided to the legal owner of property that is the site of a ☐ proposed or ☐ existing Class III Municipal Solid Waste Landfill. The Alaska Department of Environmental Conservation solid waste permit application requires that the landowner consent to the property being used as a landfill with the conditions below. As the landowner, please complete, sign, and return this form to the permit applicant."

The form is divided into several sections:

- Facility Information:** Includes fields for "Community Name:" and "Permit Applicant:".
- Property Information:** Includes a large text area for "Legal Description: include a legal description of the property or attach survey documentation." and a section for "Section:", "Township:", "Range:", and "Meridian:".
- Consent:** Includes two paragraphs of acknowledgment. The first states: "I hereby acknowledge I am the owner of the above described property and give my consent for the property to be used as a Class III Municipal Solid Waste Landfill." The second states: "I hereby also acknowledge that, as required in 18 AAC 60.306(h), upon closure of the above landfill I agree to the placement of a notation of the property deed as permanent notice that:" followed by a bulleted list:
 - The property was used as a Class III Municipal Solid Waste Landfill.
 - The property may not be suitable for some uses;
 - Maintenance and repairs to the property might become necessary to prevent pollution problems at the site; and
 - Any activity that results in damage to the final cover of the property must be corrected to control potential pollution problems.
- Landowner Signature:** Includes fields for "Organization:", "Printed Name:", "Title:", "Signature:", and "Date:".

At the bottom right, it says "Class III Landowner Consent Form Version 06-2018".

6.2 Monthly Visual Monitoring

A Monthly Visual Inspection consists of a walk around the landfill once each month to note current conditions and identify needed repairs. The compiled information can be useful for future planning. Monthly visual monitoring is required by regulation and visual monitoring forms must be kept in the landfill records for 5 years. (18 AAC 60.800)

Visual monitoring of the landfill facility must be conducted at least once each month and is best accomplished using a checklist-style form. The form ensures that all aspects of the landfill are checked each month and also provides a place for noting specific information about what is observed during the event.

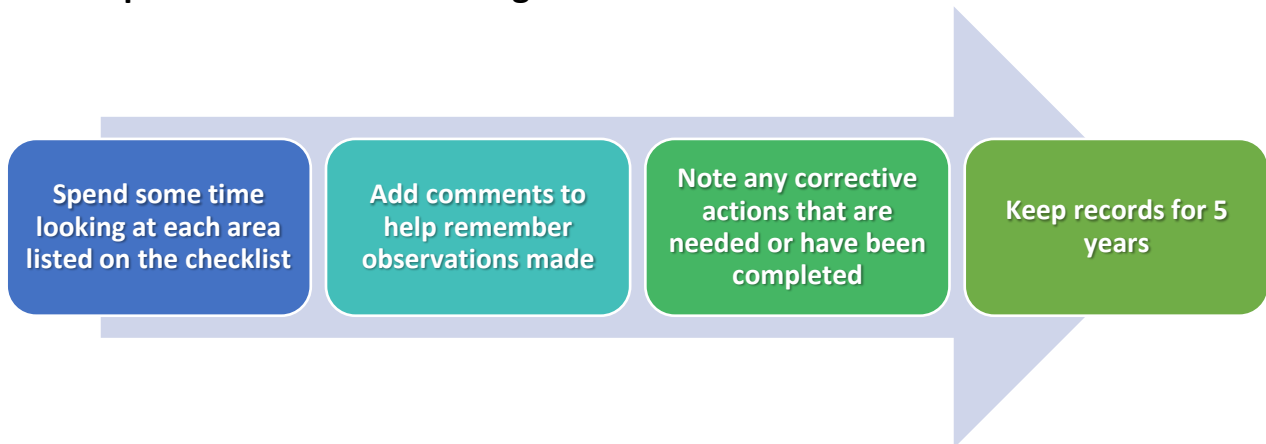
Why it is important:

Performing visual monitoring each month provides many benefits to the landfill operator. Regular visual monitoring enables the operator to keep track of general maintenance issues. For example, if the operator notices that the gate to the landfill is starting to get stuck, plans can be made to fix it before it is completely broken or unrepairable. Or if the operator notices that each spring the culverts are clogged with ice and the water isn't draining, preventative measures can be taken to keep the water from backing up.

Visual monitoring can also be a form of documentation to justify solid waste needs. Regularly documenting items that need repair, maintenance, or replacing can help justify additional operator hours or the additional funding to make needed repairs.

Visual monitoring records must be kept for 5 years. This is because the information they contain can be very useful to reference later in order to understand what has been occurring over time. For example, the information can help identify seasonal changes that regularly take place at the landfill and seasonal planning needs in order to better prepare for these changes. The information in these records will also help any new staff at the landfill understand what changes to expect around the landfill on an annual basis.

How to perform visual monitoring:



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Walk around and look at everything in the landfill, such as the access road, fence, burn unit, ditches, inactive areas, etc. It is important to look at more than just the working face (where waste is actively disposed of). Everything included on the visual monitoring form should be inspected.

It is important to fill out the comments section of the visual monitoring form. Don't leave this section blank, or just write "yes" or "no" or "none". Filling out the comments section provides a description of each area that can be used to help track whether the situation is getting better or worse upon reviewing the past records. By recording comments, a quick review of the forms will make it clear which corrective actions are still incomplete and which have been completed.

If corrective action is taken or planned, be sure to note this on the visual monitoring form.

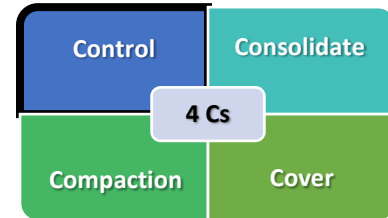
Helpful tips:

- Picking a specific day of the month to perform visual monitoring can make it easier to remember to perform it each month.
- Failure to perform visual monitoring is one area where many landfills lose points on ADEC's landfill inspections.
- Every permitted landfill includes a visual monitoring form as a part of the permit. For unpermitted landfills, ADEC can provide a visual monitoring form to use.
- Landfills can develop their own visual monitoring form tailored to the landfill as long as it covers every area of the landfill.
- Reviewing old forms before doing a new inspection will help track changes over time and provide a reminder of any needed repairs.

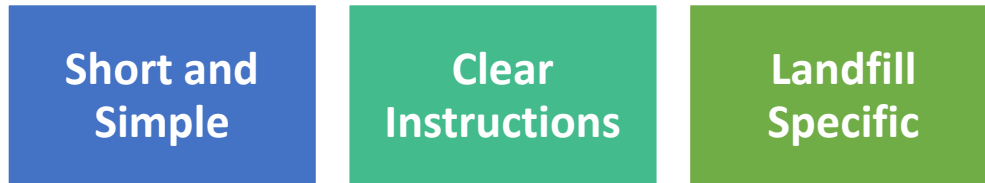
Class III Landfill Visual Monitoring Form		
Inspector: _____	Weather Conditions: _____	
Date: _____	Temperature: _____	
	Wind: _____	
	Yes/No	Comments/Corrective Action
Access Control:		
Is access road in good condition?		
Is there litter on the road to the landfill?		
Is the entrance gate locked?		
Are fence and gate in good condition?		
Landfill:		
Are signs in good condition?		
Is waste deposited in designated area?		
Has the working face increased in size?		
Does part of the landfill need to be compacted, consolidated, and covered with cover material?		
Are there any household hazardous waste (HHW) items that need to be removed from working face?		
Is there excessive litter in the landfill?		
Is there excessive odor, noise or dust coming from the landfill?		
Is there any dumping in unauthorized areas?		
Is there any evidence of target shooting?		
Is there damage to the structural integrity of a containment structure, retaining wall, erosion control, or diversion structure?		
Is there evidence of fire or combustion in the working face (i.e. hot ash smoldering, smoke from the waste, etc.)?		

6.3 Operations Plan

The operations plan is a guide for day-to-day operation and seasonal issues at the landfill. A copy of the operations plan must be kept in the operating record. (18 AAC 60.210, 18 AAC 60.235)



Key Aspects of an Operations Plan:



The operations plan is a guide for current and future landfill operators and administrators that outlines day-to-day operations at the landfill. It should be written so that anyone in the community can understand how the landfill operates.

If the landfill does not have an operations plan form, ADEC can provide a template to fill out. The ADEC template is not mandatory and other options are available. As long as they cover the specific operations at the landfill, they are acceptable to use. As operations change, the operations plan should be updated to reflect these changes. Operations plans should be reviewed annually or whenever any changes to operations occur.

Questions on the operations plan form:

When writing an operations plan, be sure to explain how work gets done at the landfill. For assistance in filling out this form, contact your ADEC Rural Landfill Specialist.

The image shows a template for a 'Class III Landfill Operations Plan' from the Alaska Department of Environmental Conservation, Solid Waste Program. The form includes sections for 'Instructions', 'General Information', and a 'Table of Contents'. The 'Instructions' section provides guidance on how to use the form. The 'General Information' section includes fields for 'Community Name', 'Authors', and 'Date'. The 'Table of Contents' lists seven sections with their corresponding page numbers.

Section	Page
1. Site Control	2
2. Burning	2
3. Daily Operations	3
4. Landfill Water Impacts	5
5. Special Waste Management	6
6. Administration	8
7. Waste Management Improvement Programs	9

Operations plan template provided by ADEC.

6.4 Site Plan

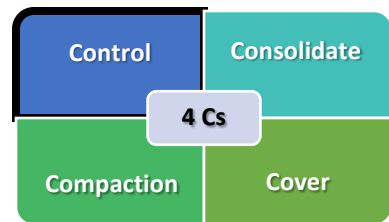
To get control of a landfill you need a plan.

A site plan is a map of the landfill property that shows where everything is.

It should be reviewed annually and updated whenever an area is closed or a new one is opened.

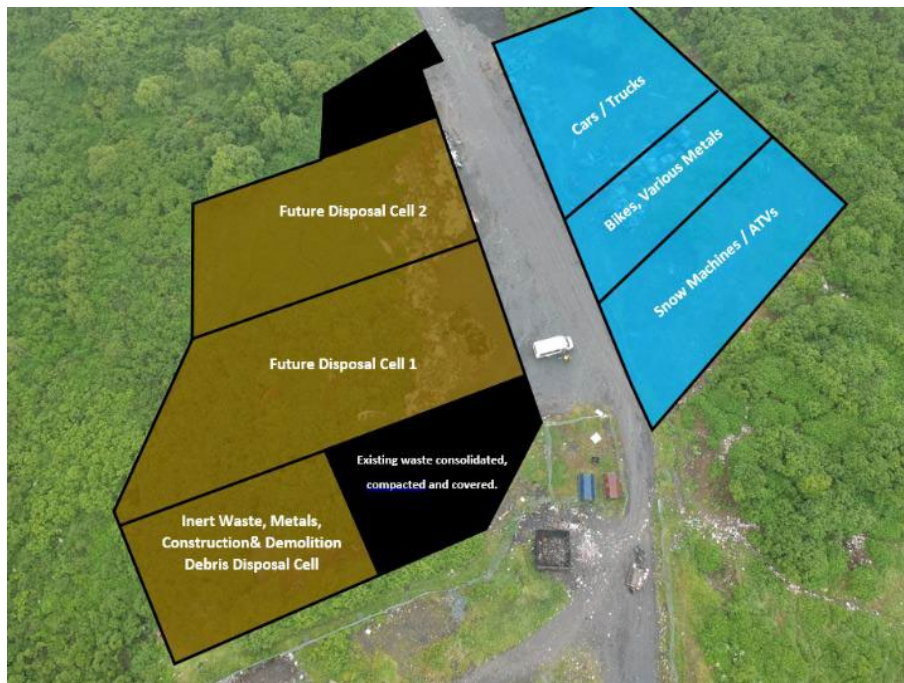
It lets people know where there is still usable space left in the landfill and identifies where things have been disposed.

Site plans can be elaborate professional documents, or they can be simple drawings of the landfill property. In fact, the best site plans are simple drawings made by the landfill operator that show where the old disposal cells are, where the waste is currently being placed, and which areas are set aside for future use. The site plan should also, if applicable, depict the different disposal areas for different types of waste, such as a carcass pit, metals area, construction and demolition debris area, household waste area, burn unit, etc.



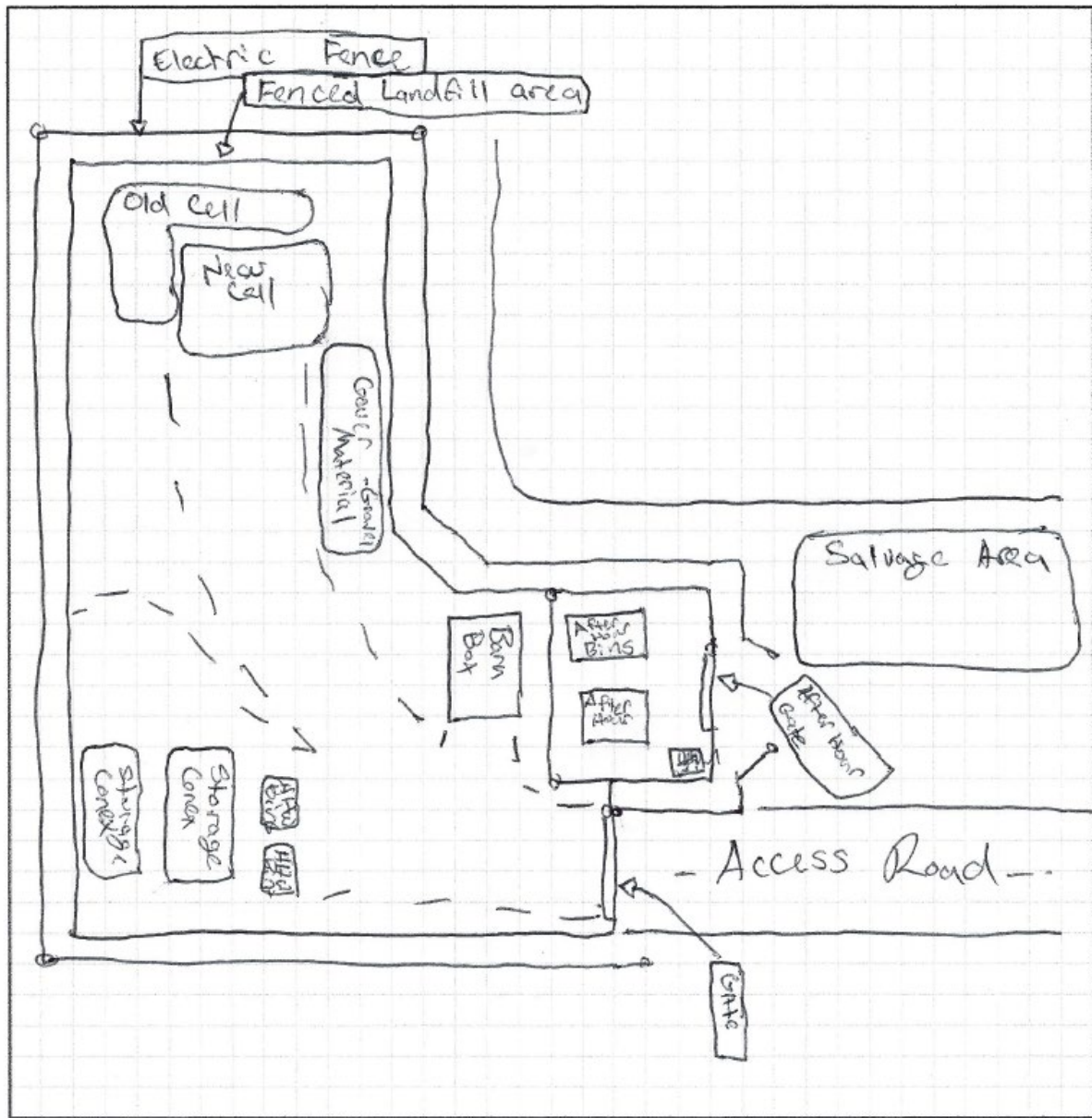
As a site plan is updated, it is important to date each version so that it is clear which one is current and when it was last updated.

Examples:



Site plan made from an aerial drone photo. The site plan shows where waste is currently placed, the metals areas, and future disposal cells.

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Hand drawn site plan showing the approximate locations of the salvage areas, burn unit, old cell, and new cells.

7.0 Waste Management Improvement Programs

7.1 Backhaul Program

Backhaul refers to transporting waste out of the community to an end-recycling or disposal destination that is often hundreds to thousands of miles away.

Backhaul is a unique component of waste management in rural Alaska. The materials most often backhauled out of rural Alaska are household hazardous waste and recyclables. Scrap metal may also sometimes be removed during backhaul. Backhauling hazardous waste protects the health of the community and the environment, while backhauling recyclables saves landfill space and thus extends the life of the landfill.

A backhaul program is a long-term program in which a community collects, stores, and backhauls specified materials out of the community on a regular basis. Sometimes a community is not capable of running a consistent backhaul program. In these cases, the community may elect to do an occasional backhaul project on an as-needed basis when funding is available. Regardless of whether a community has a long-term backhaul program or does as-needed backhaul projects, a backhaul plan is necessary. A backhaul plan outlines how the backhaul will be accomplished from start to finish.

A backhaul program should include the following elements:



Inventory

In order to develop a backhaul plan, an inventory should be taken of the materials present in the community that need to be backhauled. This simply entails making a list of the materials currently available for backhaul. Taking inventory is much easier if those materials are collected in a central location such as a recycling center. As the inventory is taken, the total weight of each material on the inventory list should also be estimated. This will help to determine if the backhaul is needed and if it will be cost effective for the community. Having a current inventory is important because transporters and recycling/disposal vendors need an accurate inventory of the materials on hand in order to provide an accurate price quote for processing and shipping fees.

If the inventory is updated on a regular basis, it will not only be clear what is currently on hand for backhaul, but the community will also have a record of all the materials that have already been backhauled.

Planning

In order to backhaul recyclable materials and other solid wastes from the community, it is important to first evaluate the local capacity to properly handle and package those items. This initial evaluation will help to determine the scope of the backhaul program or project and what is needed to prepare for it. For example, backhauling materials like aluminum cans and electronics require much less processing and training than backhauling hazardous materials like liquids, chemicals, and lead-acid batteries. Therefore, ADEC recommends starting with easier-to-process materials (like aluminum cans) and building up the capacity to manage more challenging materials.

A community's backhaul plan should consider the following:

- *What season is the best for backhaul in the area?* For some communities, it may be in the winter via an ice road, while for others it is in the summer utilizing a barge. Once it is determined which season is the best time for backhaul, the project schedule should ensure that all materials will be ready for shipment at that time.
- *What supplies are needed to backhaul?* Some common supplies include pallets, banding, banding tools, totes, supersacks, conex containers, cardboard, labels, foam board, plastic wrap, boxes for fluorescent lights, a pallet jack for weighing shipments, personal protective equipment, packing tape, etc. Note that this is not an exhaustive list, and that the supplies needed will vary based on the materials that will be backhauled.
- *Is special training or special equipment needed for the material you want to backhaul?* This depends on what will be backhauled. For example, when backhauling scrap metal, staff may need training in using the tools needed to cut and process scrap metal. If special equipment or training is needed, make sure to include the appropriate training and the purchase of needed tools in the community's backhaul plan.
- *What is the best method of transporting the materials out of the community?* Transportation options include ground transport via ice roads and/or the road system, airplanes (normal or chartered, large or small), and barges. Which option is best may depend on what will be backhauled. Evaluate each of the options for cost, efficiency, and appropriateness, then choose the best option for the situation.
- *Is transportation needed between vendors?* Determine if transportation will be needed between the harbor and the recycling vendor, to avoid being charged storage fees because the materials aren't moving to the next step in the process.

Helpful hints for backhaul planning:

- It's a good idea to prepare materials for shipment close to where they will be loaded onto the barge, truck, or airplane, especially if the transporter's equipment is needed to load the materials.
- Many companies will provide a conex for backhaul with them, but the conex must be requested in advance, sometimes up to a year before the planned backhaul event.

Training

If the people in the community have not been trained in backhaul, then it is recommended that they start with aluminum cans as these require very little training or experience. Aluminum cans can be backhauled through an organization called ALPAR (Alaskans for Litter Prevention and Recycling). ALPAR has already coordinated all of the logistics and contracts necessary to backhaul aluminum cans out of rural Alaska. They also have a complete training packet that will make this an easy material to begin with.

If the community would like to backhaul other materials, training will be required to learn how to properly package, label, manifest, and ship those specific materials. Many different organizations provide backhaul training classes. Your ADEC Rural Landfill Specialist can help locate the appropriate training.

Packaging, Labeling, and Manifesting

How backhaul materials are packaged and labeled will depend on what the materials are and on how those materials will be transported. All packaging, manifesting, and labeling is driven by the U.S. Department of Transportation (DOT) regulations. However, individual transporters may require additional steps for packaging, labeling, and manifesting, or they may have weight restrictions. Air transport and ice road transport can also require special permits issued by DOT.

Helpful tips for packaging, labeling, and manifesting:

- ADEC recommends attending a training on DOT shipping regulations. Interested parties can visit the DOT website to complete some of their free modules. However, only part of the required training can be completed online.
- Many different types of aircraft are used in rural Alaska and they all have different size and weight limitations. Before packing materials for shipment, it is important to know the limits and special requirements of the aircraft that will be used.

Common pitfalls of the shipment portion of backhaul:

- Lack of communication. Be sure to communicate with local entities, the transportation vendor, and the end destination recycler/disposal facility during each step of the backhaul project.
- Staging and timing errors: Know when the barge or plane will show up and be prepared

before it arrives. If the barge or plane arrives and the materials are not ready, they may be left behind.

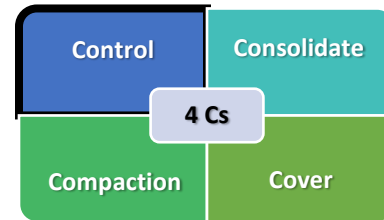
- **Equipment capacity:** Make sure heavy equipment will be able to move the shipping containers after they have been loaded.
- **Weight limitations:** Make sure not to fill containers with more weight than the carrier can support. Be sure to communicate with the carrier to determine any weight restrictions.

Communication

Communication is essential for a successful backhaul project. Plan to reach out to neighboring villages, the regional corporations, your ADEC Rural Landfill Specialist, local entities, and the transportation and end destination vendors. Open and effective communication is the foundation of every successful backhaul project.

7.2 Collection Program

A collection program is the process of picking up solid waste or recycling from households, collection bins, or transfer stations. Using a collection service keeps people away from the landfill, assists in managing solid waste properly at the landfill and reduces health risks.



Why operate a solid waste collection program?

To prevent people from being vectors.

To prevent prohibited actions at the landfill.

To reduce traffic to the landfill.

Having a collection program helps prevent people from becoming vectors and reduces traffic to the landfill. If everyone in the community has to go to the landfill to dispose of their trash, they risk transporting germs and contaminants back into the community. A collection program will limit the number of people who may transport contaminants back to the community by limiting the number of people who need to go to the landfill.

In addition to preventing people from becoming vectors, a collection program helps prevent unwanted activities that are often associated with landfills that have no access control, such as shooting, open burning, dumping of prohibited materials, etc.

Types of solid waste collection programs:

Residential household collection

- Hauler collects trash from households on a customized pickup schedule.
- Hauler may have different routes for different days.
- Local employees/private contractors serve as hauler.

Neighborhood drop-off points/mini-transfer stations

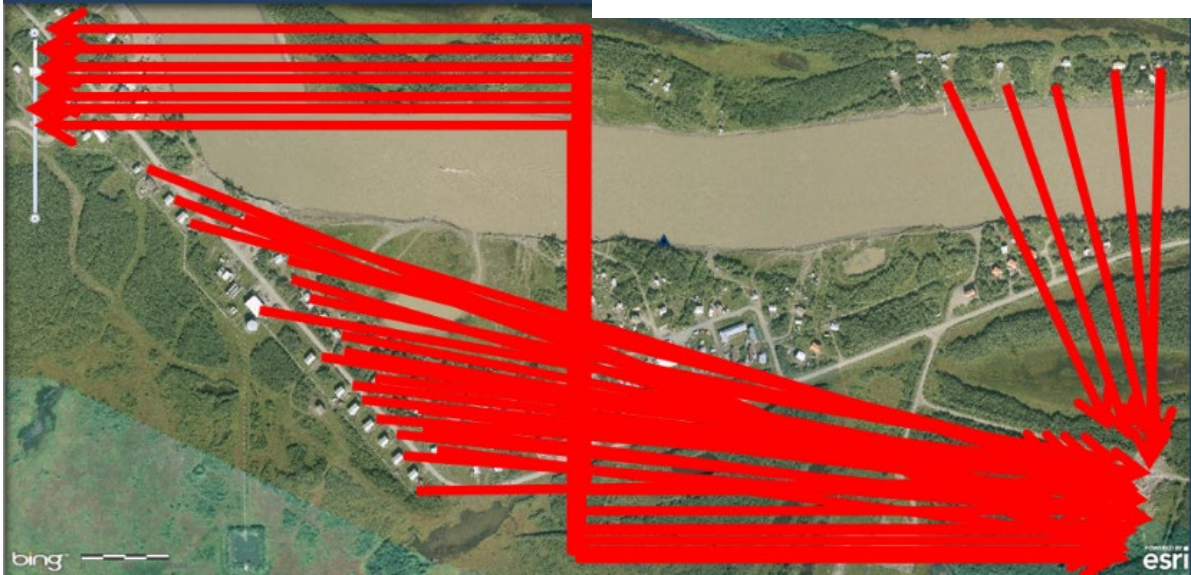
- Containers are set out at one or more locations in the community and then hauled to the landfill when full.



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- Containers should be enclosed.
- Signs should be posted at the collection sites listing prohibited wastes.

Neighborhood collection container.



Landfill trips in a self-haul community.



Landfill trips in a community with a collection program.

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Examples of collection bins/carts/trailers:



What to consider when deciding which collection program to use:

- Collection vehicle maintenance.
- How often should waste be collected? Waste will need to be collected often enough to avoid overfilling of the bins.
- Can wildlife get into the trash? If wildlife getting into trash is a problem, then the collection bin or method must be able to keep the wildlife out.
- How to keep the waste dry? Trash receptacles should have a lid that is easy for the disposer to open and close so that the receptacle doesn't fill with water from rain and snow melt.
- What kind of trash bin to use? There are two options for trash receptacles: homemade or commercially purchased. Homemade bins have the advantage of being less expensive and built to suit specific needs. Commercial trash receptacles have the benefit of being pre-assembled and potentially more heavy duty. Make sure the trash receptacles selected are easy to empty and work best with the available funding options.

Waste collection program helpful tips:

- Pick the type of collection program that will best fit the needs and capabilities of the community and landfill.
- Before implementing a collection program, make sure the landfill operator is included in the planning. If the landfill does not have an operator, find a landfill operator first.
- Include a fee with the collection program. If the program is operated at no cost for a few years before starting to collect fees, it can be very difficult to get people to pay for something that was previously free.
- Make sure the waste collection program meets the seasonal needs of the community. If more people are present in the community in the summer months, then collection frequency may need to be increased during the summer.

Types of recycling collection programs:

Drop-off

- The drop-off receptacles or structure for recyclables can be located at the landfill, in a designated office, or an area in town.
- A structure is more expensive than receptacles, but it can create a permanent drop-off location. The structure should be covered and secured with a door so that everything inside remains dry.
- Separate containers should be used for different materials, so they do not contaminate each other.
- Placement of receptacles is just as important as how many are provided. Containers should be placed where people can easily use them.

Pick-up

- In a pick-up collection program, recyclables are collected directly from homes and businesses. When someone needs their recyclables picked up, that person calls a specific department or individual to schedule the pickup.
- In some communities a large percentage of the population is comprised of elders. In these areas, a pick-up collection program may be the best option.

Recycling collection program helpful tip:

Recycling programs are often more successful when residents do not have to go out of their way to drop things off. Most residents will actively participate if the recycling point is centrally located in the community.

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Examples:



Residential waste collection program.



Residential waste collection program.



Neighborhood waste collection container.

7.3 Fees

Fee collection for waste disposal will provide a fund to pay for operations and maintenance of the landfill and waste collection program.

In statewide surveys conducted by the Solid Waste Program in 2014 and 2019, 100% of the communities that charged a fee also had a paid landfill operator. If the community can't fund a landfill operator, implementing and collecting a waste disposal fee is consistently a winning strategy. A community landfill cannot be properly managed for free!

Funds collected can be used to:

- Provide a salaried landfill operator.
- Help pay for a burn unit, fencing, heavy equipment, a collection shed, or anything else the community landfill needs.
- Conduct maintenance at the landfill such as placing cover material, doing dirt work to direct water away from waste, maintaining the heavy equipment used at the landfill, etc.
- Provide matching funds for grants or savings for a new landfill.
- Provide funds for closing the landfill.

What should be considered when calculating a landfill fee?

- *Operator costs:* wages, training, PPE, etc.
- *Landfill equipment:* operation costs, maintenance, repair costs, equipment rental costs, and lime for the septage waste trenches and carcass disposal pits. Ideally, the fees should be enough to allow saving up for equipment replacement as needed.
- *Facility maintenance:* fencing repairs, burn unit upkeep, obtaining cover material, spring cleanup activities, snow removal, etc.
- *Backhaul:* cost of the backhaul program
- *Administrative costs:* bookkeeping, time spent on sending out invoices and collecting the fees, annual permit fee, etc.
- The fee should be based on the average annual cost of the community's solid waste management program, including the items listed above. To help you do this, the ADEC Solid Waste Program has a fee worksheet, available on the solid waste program website, that can be used for calculating landfill fees.

How can people be encouraged to pay the fee?

There are many creative ways to collect fees for a landfill. Some successful options include adding an extra cost per bingo card sold, combining the landfill fee with water and wastewater bills, allowing people to pay annually when dividends are available, or offering a free month if 6

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months are paid in advance. An ordinance can also be adopted that spells out how the fee structure will work within the community.

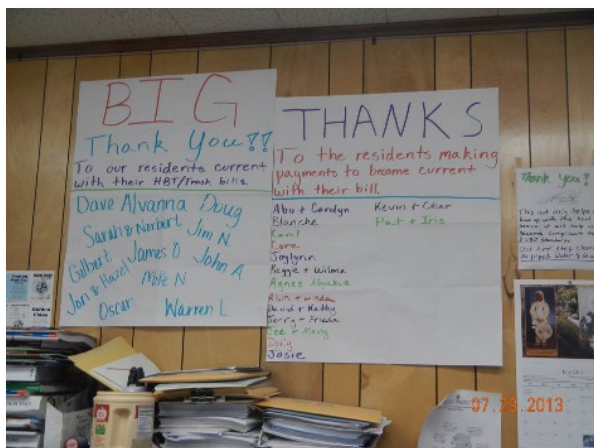
Helpful Tips:

- Use the expected annual costs of the local solid waste management program to set an applicable solid waste disposal fee.
- Community buy-in is important when implementing a fee program. Let the community know how the fees will be used. If they don't understand or see where the money collected has been used at the landfill, they are less likely to pay.
- An easy way to start can be to charge a flat rate per bag of waste disposed. Even \$1.00 per bag can make a difference.
- Install a scale at the landfill and charge per pound of waste disposed. At most landfills, a fee of at least 14 cents per pound is needed to cover operational costs.



Flyer in King Cove to encourage people to pay their landfill fees.

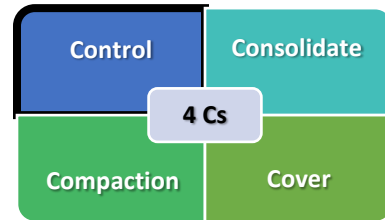
Examples:



Signs in the community office celebrating people who have paid or are working to pay their utility bills. This is one way to motivate people to pay their fees.

7.4 Landfill Operator Training

It is important that the landfill operator receives the proper training. Remember, the operator is going to be responsible for ensuring the landfill doesn't harm the environment or the people in the community. That is an important job!



There are several solid waste trainings available to make sure landfill staff learn how to properly manage the landfill. The most relevant training is the ADEC Solid Waste Bootcamp and the Rural Alaska Landfill Operator training (RALO). These training will teach operators the basics of solid waste management and what they need to know to run a rural landfill.

Other trainings that could be beneficial for landfill staff include:

- 24-hour HAZWOPER (Hazardous Waste Operations and Emergency Response)
- CFC removal training (removing refrigerant gases from refrigerators and freezers)
- Rural Alaska Landfill Administrator training (RALA)
- The Alaska Forum on the Environment (AFE) and the Alaska Tribal Conference on Environmental Management (ATCEM).
- Backhaul training
- Grant writing training
- ITEP (Institute for Tribal Environmental Professionals) mentorships
- RACEJT (Rural Alaska Community Environmental Job Training Program) and other trainings offered by Zender Environmental Health & Research Group



People attending a solid waste session at a conference.

Places to watch for training opportunities:

- ADEC Solid Waste Program website
- Zender Environmental Health & Research Group website
- Alaska Forum on the Environment website

Ways that landfill administrators can help:

Administrators can assist operators in several ways with finding and attending trainings. They can keep track of available trainings and determine when the next trainings are scheduled. The administrator can also assist with travel bookings for the operator.

Funding for training:

Some trainings are free, and others cost money. It is important to select trainings that work with the available budget in the community.

Scholarships are also an option for some training programs, so inquire about the training and any potential assistance as early as possible.

If IGAP or another type of funding is available, these funds can be used to attend trainings or to bring the training to the community. Sometimes sharing the cost of the training with a neighboring community can save money for both communities when the training is conducted locally.

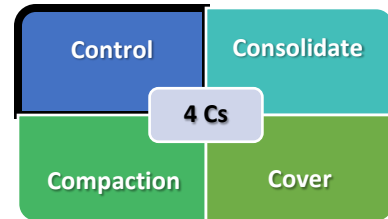


Landfill operators attending a RALO.

7.5 Community Education & Outreach

Involving the community in safe and healthy waste practices improves landfill operations and the overall health and safety impacts of the landfill.

The average person generates 7 lbs. of trash daily, which means that a community of 200 people produces 1,400lbs of trash every day! With that much garbage being generated, it's important that everyone in the community is doing their part to properly manage this trash. But how are they supposed to know what to do? This is where landfill operators, administrators, and IGAP staff come in. Using the information gained from conferences and trainings, they can educate other residents about what they need to do to help. There are many ways to spread the word, but it is important to ensure that each message is clear and short and only covers a single topic.



Outreach materials:



Tips for effective community outreach and education:

- Focus on one topic at a time.
- Tailor the message and the materials to the community.
- The message must be repeated and reinforced in order to be effective.
- Work with teachers and school children during the school year.

Types of outreach:

Community meetings

- Good way to educate the whole community at one time.
- Food, door prizes, activities, or games are good ways to improve attendance.
- It can be effective to hold an environmental community meeting around Earth Day following the spring clean-up efforts.

VHF/Radio Announcements

- A good way to deliver supplemental messages on a consistent basis.
- Weekly reminders can be issued for topics that impact the community.

Newsletter

- Keep the delivery of the newsletter consistent.
- Include applicable information regarding solid waste and recycling issues or successes in the community.
- Include information on events since the last newsletter and events scheduled in the future.

School Presentations

- Working with children is often easier than working with adults.
- Common topics that work well are litter prevention and sorting recyclables.
- Children are able to influence their parents behaviors which is why many outreach efforts begin with youth outreach.

Student Involvement

- Have students share what they have learned in school and have them create posters or signs.

Examples:



Signs for recycling outreach in the community.



Outreach signs promoting litter prevention and proper waste management within the community.

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Contacts

Solid Waste Program Staff are available for technical assistance at the following locations, or on the ADEC website <http://dec.alaska.gov/eh/solid-waste>.

Anchorage

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Anchorage, AK 99501
(907) 269-7467
(907) 269-7642

Fairbanks

610 University Avenue
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(907) 451-2135
(907) 451-2761

Juneau

410 Willoughby Avenue
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(907) 465-5318

