
Chapter 3

Surface Disposal of Biosolids

What Is Surface Disposal?

The Part 503 rule defines an activity as surface disposal if [biosolids] are placed on an area of land for final disposal. Some surface disposal sites may be used for beneficial purposes as well as for final disposal. Owners and operators of surface disposal sites and anyone who prepares biosolids for final disposal of only biosolids on a surface disposal site must meet the requirements in Subpart C of the Part 503 rule. These requirements are described in this chapter.

Surface disposal sites include monofills, surface impoundments, lagoons, waste piles, dedicated disposal sites, and dedicated beneficial use sites (see Figure 3-1.)

Monofills are landfills where only biosolids are disposed. Monofills include trenches and area fills. In trenches, biosolids are placed in an excavated area that can be a wide, shallow trench or a narrow, deep trench. In area fills, biosolids are placed on the original ground surface in mounds, layers, or diked containments. With area fills, excavation is not required (as it is with trenches) because biosolids are not placed below the ground surface. Area fills often are used when shallow bedrock or ground water is present.

Surface impoundments and lagoons are disposal sites where biosolids with a high water content are placed in an open, excavated area. If lagoons are used for treatment, they are not considered surface disposal sites.

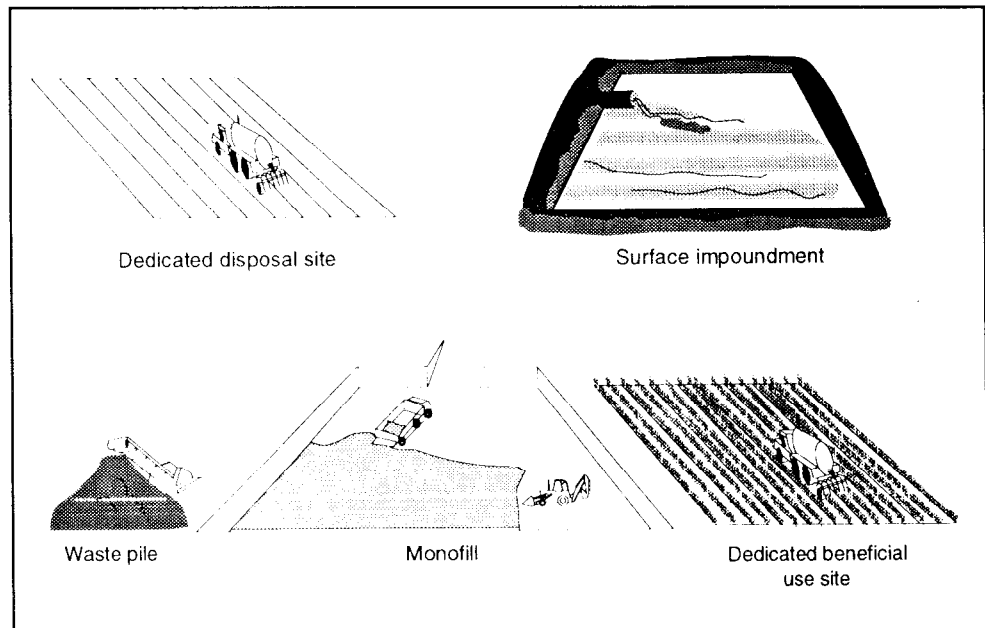


Figure 3-1. Dedicated disposal sites, surface impoundments, waste piles, biosolids monofills, and dedicated beneficial use sites are all governed by Part 503's surface disposal standards in Subpart C.

Waste piles are mounds of dewatered biosolids placed on the soil surface for final disposal.

Dedicated disposal sites receive repeated applications of biosolids for the sole purpose of final disposal. Such sites often are located at publicly owned treatment works (POTW) sites.

Dedicated beneficial use sites are surface disposal sites where biosolids are placed on the land at higher rates or with higher pollutant concentrations than are allowed when biosolids are land applied for farming or reclamation. Such sites might receive repeated applications of biosolids. In contrast to dedicated disposal sites, dedicated beneficial use sites are used to grow crops for beneficial purposes. For such sites, the permitting authority will issue a permit that specifies appropriate management practices that ensure the protection of public health and the environment from any reasonably anticipated adverse effects of certain pollutants that may be present in biosolids if crops are grown or animals are grazed.

Differentiation Among Surface Disposal, Storage, Land Application, and Treatment

An activity is considered **storage** if biosolids are placed and remain on land for 2 years or less. If biosolids remain on land for longer than 2 years, this land is considered an active [biosolids] unit and the surface disposal

requirements in Part 503 have to be met. An **active biosolids unit** is the area, trench, waste pile, or lagoon where biosolids are currently being placed. Please note, however, that biosolids can remain on the land for longer than 2 years, but the person who prepares the biosolids must demonstrate that the site is not an active biosolids unit. The demonstration must include the following information:

- the name and address of the person who prepares the biosolids;
- the name and address of the person who either owns the land or leases the land;
- the location, by either street address or latitude and longitude, of the land;
- an explanation of why biosolids need to remain on the land for longer than 2 years prior to final use or disposal, or why a site is used for longer than 2 years to store batches of biosolids for less than 2 years (e.g., storage of individual batches of biosolids for several months during a given 2-year period before final use or disposal); and
- the approximate time when biosolids will be transferred from storage to their final use or disposal destination.

This demonstration information must be retained by the person who prepares the biosolids for the period that the biosolids remain on the land.

Any practice in which biosolids that meet pollutant concentrations, CPLRs, or APLRs, as well as ceiling limits are applied to land at agronomic rates to condition soil or to fertilize crops or vegetation is considered land application, not surface disposal. Regulatory requirements for land application are discussed in Chapter Two.

The surface disposal provisions of the Part 503 rule do not apply when biosolids are treated on the land, such as in a treatment lagoon or stabilization pond, and treatment could be for an indefinite period. Placement of biosolids on the land in a municipal solid waste landfill also is not considered surface disposal under Part 503, but would be covered under 40 CFR Part 258 instead.

Regulatory Requirements for Surface Disposal of Biosolids

A Part 503 standard for surface disposal of biosolids includes:

- general requirements
- pollutant limits
- management practices
- operational standards for pathogen and vector attraction reduction
- frequency of monitoring requirements

- recordkeeping requirements
- reporting requirements

These seven elements are discussed below.

General Requirements for Surface Disposal Sites

Placement. No person shall place [biosolids] on an active [biosolids] unit unless the requirements in Subpart C of Part 503 (described in this chapter) are met.

Closure is required if a unit is located in certain types of areas. If an active biosolids unit is located within 60 meters of a geologic fault with displacement in Holocene time (i.e., relatively recently), located in an unstable area, or located in a wetland, the unit must have closed by March 22, 1994. There are two exceptions to this requirement: (1) if the permitting authority has indicated that the location of a specific unit within 60 meters of a fault with displacement in Holocene time is acceptable, or (2) if a permit was issued under Section 402 of the Clean Water Act that allows the unit to be located in a wetland.

When a unit is closing, the permitting authority must be notified. If an active biosolids unit is about to be closed, the owner/operator of the unit must provide the permitting authority with a written plan at least 180 days prior to the closing. The Plan must describe closure and post-closure activities and systems; for example, (1) the operation and maintenance of the leachate collection system for 3 years after closure (if the unit has such a system); (2) the system used to monitor the air for methane gas for 3 years after closure (if biosolids units are covered); and (3) measures to restrict public access for 3 years after closure.

The permitting authority may determine that the closure plan must include provisions for monitoring the air for methane gas or leachate collection for more than 3 years. For example, if the biosolids placed on the surface disposal site were not stabilized, it may be necessary to monitor the air for methane gas and restrict access for a longer period to protect public health and the environment. Also, in areas of high rainfall, the permitting authority may deem it necessary to collect leachate for a longer period to ensure that the integrity of the liner is maintained.

The subsequent owner must be notified of the presence of biosolids. Should ownership of a surface disposal site change hands, the owner must provide the subsequent owner with written notification that biosolids were placed on the land.

The notification required for the subsequent owner of a surface disposal site will vary depending on when the land was sold and the provisions of the closure plan. For instance, if a surface disposal site was covered, had a

liner, and was sold 1 year after closure, the notification should inform the next owner that the property was used to dispose of biosolids and that the new owner must operate the leachate collection system, monitor the air for methane gas, and restrict public access for an additional 2 years.

Pollutant Limits for Biosolids Placed on Surface Disposal Sites

For surface disposal, a pollutant limit is the amount of pollutant allowed per unit amount of biosolids. Subpart C of Part 503 sets pollutant limits for arsenic, chromium, and nickel in biosolids. These limits apply only to active biosolids units without liners and leachate collection systems. Where applicable, representative samples of biosolids must be collected and analyzed for metals using the methods listed in the regulation (see Chapter Six for more information about sampling and analysis).

A **liner** is a layer of relatively impervious soil, such as clay, or a layer of synthetic material that covers the bottom of an active biosolids unit and has a hydraulic conductivity of 1×10^{-7} centimeters/second or less. The liner slows the seeping of liquid on the surface disposal site into the ground water below. A **leachate collection system** is a system or device installed immediately above a liner that collects and removes leachate as it seeps through the disposal site. Biosolids placed on an active biosolids unit with a liner and leachate collection system do not have to meet pollutant limits, based on the assumption that these systems prevent pollutants from migrating to ground water.

There are two options for meeting the pollutant limits for arsenic, chromium, and nickel in active biosolids units without using liners and leachate collection systems, as summarized in Table 3-1 and discussed below. The **first option** is to ensure that the levels of arsenic, chromium, and nickel are below the pollutant limits listed in Table 3-2. These limits are based on how

TABLE 3-1
How To Meet Pollutant Limits for Surface Disposal of Biosolids

Meet 1 of the 2 options.

Option 1:

Make sure that the levels of arsenic, chromium, and nickel are not above the levels listed in Table 3-2, which are based on the distance between the active biosolids unit's boundary and the property line of the surface disposal site.

Option 2:

Meet the site-specific pollutant limits for arsenic, chromium, and nickel, if site-specific limits have been set by the permitting authority.

TABLE 3-2
Option 1—Pollutant Limits

Location in the Part 503 Rule	Distance from the Boundary of Active Biosolids Unit to Surface Disposal Site Property Line (meters)	Pollutant Concentration *		
		Arsenic (mg/kg)	Chromium (mg/kg)	Nickel (mg/kg)
Table 2 of Section 503.23	0 to less than 25	30	200	210
	25 to less than 50	34	220	240
	50 to less than 75	39	260	270
	75 to less than 100	46	300	320
	100 to less than 125	53	360	390
	125 to less than 150	62	450	420
Table 1 of Section 503.23	Equal to or greater than 150	73	600	420

* Dry-weight basis (basically, 100% solids content).

far the boundary of each active biosolids unit is from the surface disposal site property line. For example, the limits are 73 milligrams per kilogram (mg/kg) for arsenic, 600 mg/kg for chromium, and 420 mg/kg for nickel if the boundary of the active biosolids unit closest to the site's property line is greater than 150 meters away.

There may be more than one active biosolids unit at a surface disposal site. If the boundary of a second active biosolids unit on the same site is 75 meters from the property line, then the arsenic limit for that second unit would be 46 mg/kg. Thus different active biosolids units on the same site can have different pollutant limits, based on the closest distance between the active biosolids unit boundaries and the property line of the surface disposal site.

The **second option** for meeting pollutant limits is to meet "site-specific" limits set by the permitting authority, who would determine the limits after evaluating site data. The owner/operator of the surface disposal site must request site-specific limits when applying for a permit. The permitting authority then must determine whether site-specific pollutant limits are appropriate for the particular site.

Site-specific limits may be justified if the site conditions vary significantly from those assumed in the risk assessment used to derive the Part 503 pollutant limits. In general, if the depth to ground water is considerable or a natural clay layer underlies the site, the permittee may consider requesting site-specific pollutant limits.

Management Practices for Surface Disposal of Biosolids

The Part 503 rule includes management practices that must be followed when biosolids are placed on a surface disposal site. Most of these management practices apply to all surface disposal sites. A few, however, apply only to sites with liners and leachate collection systems or to sites with covers. (A cover can be soil or other material placed over the biosolids.) The required management practices for surface disposal sites are summarized in Table 3-3 and discussed in more detail below.

Protection of Threatened or Endangered Species

This requirement applies to persons who place biosolids on land where there is potential for harming certain species of plants, fish, or wildlife or their habitat. Biosolids cannot be placed on an active biosolids unit in a

TABLE 3-3
Management Practices for Surface Disposal Sites

Biosolids placed on a disposal unit must not harm threatened or endangered species

The active biosolids unit must not restrict base flood flow

The active biosolids unit must be located in a geologically stable area:

- must not be located in an unstable area
- must not be located in a fault area with displacement in Holocene time (unless allowed by the permitting authority)
- if located in a seismic impact zone, must be able to withstand certain ground movements

The active biosolids unit cannot be located in wetlands (unless allowed in a permit)

Runoff must be collected from the surface disposal site with a system capability to handle a 25-year, 24-hour storm event

Only where there is a liner, must leachate be collected and must the owner/operator maintain and operate a leachate collection system

Only where there is a cover, must there be limits on concentrations of methane gas in air in any structure on the site and in air at the property line of the surface disposal site

The owner/operator cannot grow crops on site (unless allowed by the permitting authority)

The owner/operator cannot graze animals on site (unless allowed by the permitting authority)

The owner/operator must restrict public access

The biosolids placed in the active biosolids unit must not contaminate an aquifer

surface disposal site where such disposal is likely to have an adverse affect on a threatened or endangered animal or plant species or its "critical habitat." Threatened or endangered species and their critical habitats are listed in Section 4 of the Endangered Species Act. (The Threatened and Endangered Species List can be obtained from the U.S. Fish and Wildlife Service's [FWS's] Publications Office by calling 703-358-1711.) Critical habitat is defined as any place where a threatened or endangered species lives and grows during any stage of its life cycle.

Any direct or indirect action (or the result of any direct or indirect action) in a critical habitat that diminishes the likelihood of survival and recovery of a listed species is considered destruction or adverse modification of a critical habitat. Individuals may contact the Endangered Species Protection Program in Washington, DC (703-358-2171) or FWS Field Offices listed in Appendix C for more information about threatened and endangered species considerations in their area. State departments governing fish and game also should be contacted for specific State requirements.

Restriction of Base Flood Flow

An active biosolids unit in a surface disposal site must not restrict the flow of a base flood. A **base flood** is a flood that has a 1 percent chance of occurring in any given year (or a flood that is likely to occur once in 100 years). This management practice reduces the possibility that an active biosolids unit might negatively affect the ability of an area to absorb the flows of a base flood. The practice also helps to prevent surface water contamination and to protect the public from the possibility of a base flood releasing biosolids to the environment.

To determine whether a surface disposal site is in a 100-year flood plain, consult the flood insurance rate maps (FIRMs) and flood boundary and floodway maps published by the Federal Emergency Management Agency (FEMA) (Flood Map Distribution Center, 6930 [A-F] San Thomas Road, Baltimore, MD 21227). States, counties, and towns usually have maps delineating flood plains as well. Other agencies that maintain flood zone maps are the U.S. Army Corps of Engineers (COE), the U.S. Geological Survey (USGS), the U.S. Soil Conservation Service (SCS), and the Bureau of Land Management (BLM).

If the owner/operator of a surface disposal site determines that the site is within a 100-year flood zone, the permitting authority has ultimate responsibility for determining whether the active biosolids unit will restrict the flow of a base flood. This assessment considers the flood plain storage capacity and the floodwater velocities that would exist with and without the presence of the biosolids unit. If the presence of the unit would cause the base flood level to rise one additional foot, then the unit restricts the flow of

a base flood, potentially causing more flood damage than would otherwise occur.

If the permitting authority determines that the active biosolids unit will restrict the flow of the base flood, it may require the unit to close or it may require remedial action to avoid the restriction of the base flood flow. Such actions might include constructing embankments or implementing an alternative unit design intended to prevent the unit from being damaged by floodwaters.

Geological Stability

Three of the management practices in the Part 503 rule concern the distance of active biosolids units from certain types of geologic formations. These management practices help ensure that biosolids units are located in geologically stable areas or that the units can withstand certain ground movements. The geologic formations covered by these management practices are fault areas with displacement in Holocene time, unstable areas, and seismic impact zones:

Fault—A crack in the earth along which the ground on either side may move. Such ground movement is called displacement. An active biosolids unit must be located at least 60 meters from a fault that has displacement measured in Holocene time (recent geological time of approximately the last 11,000 years). Requiring this distance from a fault helps ensure both that the structures of a biosolids unit will not be damaged if ground movement occurs in a fault area and that leachate will not spread through faults into the environment. This management practice must be followed unless the permitting authority has determined otherwise.

Unstable Area—Land where natural or human activities might occur that could damage the structures of an active biosolids unit and allow the release of pollutants into the environment. Unstable areas include land where large amounts of soil are moved, such as by landslides, where the surface lowers or collapses when underlying limestone or other materials dissolve. An active biosolids unit cannot be located in an unstable area. This restriction protects the structures of a biosolids unit from damage by natural or human forces. Owner/operators of surface disposal sites may need to perform local geological studies to determine that unstable conditions do not exist at their sites.

Seismic Impact Zone—An area in which certain types of ground movements (“horizontal ground level acceleration”) have a 10 percent or greater chance of occurring at a certain level (measured as “0.10 gravity”) once in 250 years. The USGS keeps records of the location of these areas. When a surface disposal site is located in a seismic impact zone, each active biosolids unit must be designed to withstand the maximum recorded horizontal ground level acceleration. This

management practice helps ensure that the containment structures, such as the liner and leachate collection system, of a biosolids unit will not crack or collapse because of ground movement and that leachate will not be released due to seismic activity. Various seismic design methods have been developed for biosolids units located in seismic impact zones. Appropriate design modifications may include shallower unit side slopes and a more conservative design for dikes and runoff controls. Also, contingencies for the leachate collection system should be considered, in case the primary system becomes ineffective.

If these management practices are followed, it is less likely that pollutants in biosolids will be released into the environment because of unstable geological conditions. Individuals can determine whether property is within a geologically unstable area using maps that are available through the USGS, Earth Science Information Center, 12201 Sunrise Valley Drive, Reston, VA, 22092 (800-872-6277). States also have geological surveys that map the locations of geologically unstable areas. (For example, in California guidelines for identifying fault areas are available from the California Division of Mines and Geology.)

Protection of Wetlands

Wetlands are areas in which the soils are filled with water (“saturated”) during part of the year and that support vegetation typically found in saturated soils. Examples of wetlands include swamps, marshes, and bogs. Wetlands perform important ecological functions, such as holding floodwaters, serving as habitat and providing sources of food for numerous species including 60% of the endangered species, and reducing soil erosion. Wetlands also hold pollutants, preventing them from contaminating other areas.

An active biosolids unit cannot be located in a wetland unless the owner/operator holds a valid permit issued under Section 402 (a National Pollutant Discharge Elimination System [NPDES] permit) or Section 404 (a dredge and fill permit) of the Clean Water Act. Controlling where active biosolids units are located protects wetlands from possible contamination when biosolids are placed in an active biosolids unit.

If the owner/operator of a surface disposal site suspects that all or some portion of an active biosolids unit is in a wetland, he or she should contact the local COE District Office to request a wetland delineation. The assessment used to determine whether there are wetlands present must be conducted by a qualified and experienced team of experts in soil science and botany/biology. Criteria for identifying wetlands have been developed by a federal task force and appear in a manual published by the COE (*Federal Manual for Identifying and Delineating Jurisdictional Wetlands*, 1989).

The state agency regulating activities in wetlands also should be asked to inspect the area in question. The definition of a wetland and the regulatory requirements for activities in wetlands may be different at the State level.

Collection of Runoff

Runoff is rainwater or other liquid that drains over the land and runs off the land surface. Runoff from an active biosolids unit might be contaminated with biosolids. Runoff from an active biosolids unit must be collected and disposed according to the permit requirements of the NPDES and any other applicable requirements. The runoff collection system must have the capacity to handle runoff from a 25-year, 24-hour storm event (a storm that is likely to occur once in 25 years for a 24-hour period). This requirement helps ensure that runoff (which may contain pollutants) from an active biosolids unit is not released into the environment. The peak flow of water and the total runoff volume of water during the 25-year, 24-hour storm must be calculated to ensure that the extent of stormwater controls is adequate to collect runoff from such a storm.

Information about storm events usually can be obtained from local planning agencies, civil works departments, or zoning boards.

Collection of Leachate

Leachate is fluid from excess moisture in biosolids or from rainwater percolating down through the active biosolids unit from the land surface. If an active biosolids unit has a liner and a leachate collection system, two additional management practices in the Part 503 rule apply.

The first management practice requires that the leachate collection system be operated and maintained according to design requirements and engineering recommendations. The owner/operator of the surface disposal site is responsible for ensuring that the system is always operating according to design specifications and is properly and routinely maintained (e.g., pumps are periodically cleaned and serviced; and the system is periodically inspected to detect clogs and flushed to remove deposited solids).

The second management practice requires that leachate be collected and disposed in accordance with applicable requirements. Leachate should be collected and pumped out by a system placed immediately above a liner. If leachate is discharged to surface water as a point source, then an NPDES permit is required. Otherwise, leachate may be used to irrigate adjacent land or discharged to a POTW. It is recommended that the leachate be tested to determine whether some treatment is appropriate before irrigating or discharging it to a POTW.

Both management practices must be followed while the unit is active and then for 3 years after the unit is closed, or for a longer period if required by the permitting authority.

These management practices help prevent pollutants in biosolids placed on surface disposal sites from being released into the environment. For example, if leachate is not collected regularly, or if the leachate collection system is not operated and maintained properly, then the liner could be damaged by the weight of the leachate pressing against it and the leachate could leak into the ground water. As mentioned above, the leachate collection requirements only apply to active biosolids units and closed units with a liner and leachate collection system; the requirements apply for a minimum of 3 years after unit closure.

The Part 503 rule regulates active biosolids units without liners and leachate collection systems through the pollutant limits discussed in the previous section and through other management practices in the regulation.

Limitations on Methane Gas Concentrations

The Part 503 rule includes a management practice that limits concentrations of methane gas in air because of its explosive potential. Methane, an odorless and highly combustible gas, is generated at surface disposal sites when biosolids are covered by soil or other material (e.g., geomembranes), either daily or at closure. The gas can migrate and be released into the environment. To protect site personnel and the public from risks of explosions, air must be monitored for methane gas continuously within any structure on the site and at the property line of the surface disposal site. Only surface disposal sites *that cover biosolids units* (either daily or at closure) must meet this management practice. When biosolids units are not covered, the air does not have to be monitored for methane gas.

This management practice limits the amount of methane gas in air in both active and closed biosolids units. When a cover is placed on an active biosolids unit, the methane gas concentration in air in any structure within the property line of a surface disposal site must be less than 25% of the lower explosive limit (LEL) (i.e., 1.25%). The LEL is the lowest percentage (by volume) of methane gas in air that supports a flame under certain conditions (at 25°C and atmospheric pressure). For methane, the LEL is 5%. Therefore, if 5% of the LEL is 50,000 ppm methane, then air in any structure within the property line must not exceed 12,500 ppm methane.

A methane gas monitoring device must be installed so that methane concentrations in the air inside all structures on the property are continuously measured and the measurement can be read by any individual before entering the structure. (The act of entering the building could create enough of a spark to ignite explosive levels of methane gas.)

For air at the property line of a surface disposal site with a covered biosolids unit, the limit for methane gas concentration is the LEL (i.e., 5%). In some cases, the permitting authority may determine that a methane monitoring device at one downwind location on the property line is adequate to meet this requirement because the wind patterns are consistent. In other cases, where wind conditions at the site are highly variable, more than one device may be necessary to provide adequate protection.

Methane gas concentrations must be monitored at all times when the biosolids units are active and for 3 years after the last active biosolids unit on the site is closed. If unstabilized biosolids are disposed at a site, the permitting authority may require methane gas to be monitored for longer than 3 years after closure because of the higher potential for methane generation with unstabilized biosolids.

Methane monitoring devices allow the user to read the level of methane as a percent of the LEL. Some can be equipped with alarms, which may be desirable in structures with a potential for allowing the concentration of methane gas to reach explosive levels. Various methods (e.g., venting systems, positive or negative air pressure systems) are available to reduce methane gas concentrations.

Restrictions on Crop Production

Food, feed, or fiber crops may not be grown on an active biosolids unit unless the owner or operator of the surface disposal site can demonstrate to the permitting authority that through management practices public health and the environment are protected from any reasonably anticipated adverse effects of certain pollutants that may be present in biosolids. If the owner/operator wishes to grow crops on the site, he or she must obtain a permit that requires the implementation of certain management practices to ensure that the levels of pollutants taken up by crops do not negatively affect the food chain in regard to animals or humans.

These special management practices might include testing crops and animal tissue for the presence of pollutants if animal feed is produced on the site, or setting a monitoring schedule for the crops and any animal feed products derived from crops grown on the site.

Restrictions on Grazing

Animals must not be grazed on an active biosolids unit unless the owner/operator of a surface disposal site can demonstrate to the permitting authority that public health and the environment are protected from any reasonably anticipated adverse effects of certain pollutants that may be present in biosolids. If the owner/operator wishes to graze animals on the site, he or she must obtain a permit. The permit could require specified management practices, such as monitoring the concentration of pollutants

in any animal product (dairy or meat). This restriction on grazing helps ensure that unsafe levels of pollutants do not find their way into animals from which people obtain food.

In this document, a site where a special permit allows the production of crops and/or grazing, is considered a ***dedicated beneficial use site***.

Restrictions on Public Access

Public access to a surface disposal site must be restricted while an active biosolids unit is on the site and then for 3 years after the last active biosolids unit has been closed. This management practice helps to minimize public contact with any pollutants, including pathogens, that may be present in biosolids placed on an active biosolids unit. It also keeps people away from areas where there is a potential for a methane gas explosion, as discussed above.

Fencing off an area and installing gates that lock might be necessary to restrict access in densely populated areas. Natural barriers, such as hedges, trees, embankments, or ditches, along with warning signs, might be adequate in less-populated areas. In remote areas, it might be sufficient to post warning signs that say, "Do not enter," "No trespassing," or "Access restricted to authorized personnel only."

Protection of Ground Water

This management practice states that biosolids placed on an active biosolids unit must not contaminate an aquifer. An aquifer is an area below the ground that can yield water in large enough quantities to supply wells or springs. ***Contaminating an aquifer*** in this instance means introducing a substance that can cause the level of nitrate in ground water to increase above regulated limits. This management practice also requires that the owner/operator obtain proof that ground water is not contaminated. This proof must be either by way of (1) a ground-water monitoring program developed by a qualified ground-water scientist, or (2) certification by a ground-water scientist that ground water will not be contaminated by the disposal of biosolids at the site.

Usually, certification is an option only if the site has a liner and a leachate collection system. It is generally infeasible for a ground-water scientist to certify that ground water will not be contaminated in the absence of a liner, unless the depth to ground water is considerable and there is a natural clay layer under the soil or unless the amount of biosolids placed on the site is quite small (e.g., at the agronomic or reclamation rate).

Only nitrate-nitrogen levels in ground water are addressed by this management practice. Nitrate-nitrogen levels in ground water must not exceed the maximum contaminant level (MCL) of 10 mg/liter or must not increase an existing exceedance of the ground water MCL for

nitrate-nitrogen. Potential pollutants other than nitrate are addressed by pollutant limits, which are discussed in the previous section.

Pathogen and Vector Attraction Reduction Requirements for Surface Disposal Sites

Pathogens are disease-causing organisms, such as certain bacteria and viruses, that might be present in biosolids. **Vectors** are animals, such as rats or insects, that might be attracted to biosolids and can spread disease after coming into contact with the biosolids. The Part 503 rule includes requirements concerning the control of pathogens and the reduction of vector attraction for biosolids placed on a surface disposal site. Biosolids can be placed on an active biosolids unit only if the pathogen and vector attraction reduction requirements are met (see Table 3-4 and discussion below).

For pathogen reduction, the biosolids placed on an active biosolids unit must meet either "Class A" or "Class B" pathogen requirements, or a cover

TABLE 3-4
Pathogen and Vector Attraction Reduction Requirements
for Surface Disposal Sites

Pathogen Reduction Requirements (see Chapter Five)

Options (must meet one of these):

- Place a daily cover on the active biosolids unit
- Meet one of six Class A pathogen reduction requirements (see Table 5-1)
- Meet one of three Class B pathogen reduction requirements, except Site Restrictions (see Table 5-5)

Vector Attraction Reduction Requirements (see Chapter Five)

Options (must meet one of these):

- Place a daily cover on the active biosolids unit
- Reduce volatile solids content by a minimum of 38% or less under specific laboratory test conditions with anaerobically and aerobically digested biosolids
- Meet a specific oxygen uptake rate (SOUR)
- Treat the biosolids in an aerobic process for a specified number of days at a specified temperature
- Raise the pH of the biosolids with an alkaline material to a specified level for a specified time
- Meet a minimum percent solids content
- Inject or incorporate the biosolids into soil

(soil or other material) must be placed on the active biosolids unit at the end of each day. If a daily cover is placed on the active biosolids unit, no other pathogen reduction requirements apply. If the biosolids meet Class B requirements, the “site restrictions” that apply to Class B do not have to be followed because the management practices for surface disposal already include these site restrictions.

For vector attraction reduction, one of several options listed in Table 3-4 must be met. Representative samples of biosolids must be collected and analyzed to demonstrate that the pathogen and vector attraction reduction requirements have been met using the methods listed in the regulation (see Chapter Six for more information on sampling and analysis).

Pathogen and vector attraction reduction requirements, including Class A and Class B pathogen requirements, are discussed in more detail in Chapter Five and in Subpart D of the Part 503 rule. In most cases, owners or operators of surface disposal sites will place a daily cover on the biosolids unit to meet pathogen and vector attraction reduction requirements.

Frequency of Monitoring Requirements for Surface Disposal Sites

The monitoring of several different parameters is required at surface disposal sites, as shown in Table 3-5. Monitoring is required for surface disposal sites without liners to determine levels of arsenic, chromium, and nickel in biosolids. Monitoring is required in both lined and unlined sites to show that the chosen pathogen and vector attraction reduction requirement is being met and to measure the amount of methane gas in air at a covered surface disposal site. How frequently biosolids must be monitored is determined according to the amount of biosolids placed on an active biosolids unit, as shown in Table 3-6. The permitting authority may require more frequent monitoring; for example, if the pollutant and pathogen levels in the biosolids are highly variable.

After biosolids have been monitored for 2 years at the frequency specified in Table 3-6, the permitting authority may reduce the frequency of monitoring for arsenic, chromium, nickel, and, under limited circumstances, pathogens in biosolids placed on an active biosolids unit. The frequency may be reduced, for example, if the pollutant levels in biosolids do not vary greatly or if pathogens are never detected when using Class A Alternative 3 to meet pathogen reduction requirements. (See Chapter Five for details about pathogen reduction alternatives.) At the least, monitoring must be performed once a year.

Methane gas in air must be monitored continuously, both at the property line of the surface disposal site and within each structure at the site, if an active biosolids unit is covered. Methane gas monitors can be installed permanently to continuously test the air and provide readings of methane

**TABLE 3-5
Monitoring Required at Surface Disposal Sites**

What Must Be Monitored:	In
Arsenic	Biosolids
Chromium	Biosolids
Nickel	Biosolids
Pathogens	Biosolids for several options
Vector attraction reduction	Biosolids for several options
Methane gas	Air in each structure on site
Methane gas	Air at surface disposal site property line

levels as a percent of the LEL. Monitoring must be continued as long as any covered biosolids unit on the site is active and then for 3 years after the last biosolids unit has been closed, if covered at closure.

Recordkeeping Requirements for Surface Disposal Sites

Certain information must be recorded and kept for 5 years from the time the biosolids are placed on a surface disposal site. A separate set of records must be kept by a person who prepares biosolids for placement on a surface disposal site and by the owner/operator of a surface disposal site.

**TABLE 3-6
Frequency of Monitoring for Surface Disposal of Biosolids**

Amount of Biosolids* (metric tons per 365-day period)	Amount of Biosolids (English tons)		Minimum Frequency
	Avg. per day	per 365 days	
Greater than zero but less than 290	>0 to <0.85	>0 to <320	Once per year
Equal to or greater than 290 but less than 1,500	0.85 to <4.5	320 to <1,650	Once per quarter (four times per year)
Equal to or greater than 1,500 but less than 15,000	4.5 to <45	1,650 to 16,500	Once per 60 days (six times per year)
Equal to or greater than 15,000	≥45	≥16,500	Once per month (twelve times per year)
Methane gas in air			Continuously with methane monitoring device if biosolids unit is covered

* Amount of biosolids (other than domestic septage) placed on active biosolids units—dry-weight basis.

These sets of specific recordkeeping requirements for surface disposal sites are described below.

Records That Must Be Kept by the Preparer of Biosolids for Placement on a Surface Disposal Site

The preparer of biosolids to be placed on an active biosolids unit must develop and keep the following information for 5 years:

- the concentrations of arsenic, chromium, and nickel in biosolids for active biosolids disposal units without a liner and leachate collection system with boundaries that are 150 meters or more from the surface disposal site's property line;
- a certification statement, as worded in Figure 3-2; and
- a description of how certain pathogen and vector attraction reduction requirements are met.

Records That Must Be Kept by the Owner/Operator of a Surface Disposal Site

An owner/operator of a surface disposal site on which biosolids are placed must develop and keep the following information for 5 years:

- the concentrations of arsenic, chromium, and nickel in biosolids for active biosolids units with boundaries less than 150 meters from the property line or for active biosolids units with site-specific limits;
- a certification statement, as worded in Figure 3-3;
- a description of how the management practices for surface disposal

FIGURE 3-2

Certification Statement Required for Recordkeeping: Preparer of Biosolids Placed on Surface Disposal Site

"I certify, under penalty of law, that the pathogen requirements in [insert §503.32(a), §503.32(b)(2), §503.32(b)(3), or §503.32(b)(4) when one of these requirements is met] and the vector attraction reduction requirements in [insert one of the vector attraction reduction requirements in §503.32(b)(1) through §503.32(b)(8) when one of these requirements is met] have/have not been met. This determination has been made under my direction and supervision in accordance with the system designed to ensure that qualified personnel properly gather and evaluate the information used to determine that the [pathogen requirements and vector attraction reduction requirements if appropriate] have been met. I am aware that there are significant penalties for false certification, including the possibility of fine and imprisonment."

Signature

Date

FIGURE 3-3
Certification Statement Required for Recordkeeping:
Owner/Operator of Surface Disposal Site

“I certify, under penalty of law, that the management practices in §503.24 and the vector attraction reduction requirement in [insert one of the requirements in §503.33(b)(9) through §503.33(b)(11), if one of those requirements is met] have/have not been met. This determination has been made under my direction and supervision in accordance with the system designed to ensure that qualified personnel properly gather and evaluate the information used to determine that the management practices [and the vector attraction reduction requirements, if appropriate] have been met. I am aware that there are significant penalties for false certification, including the possibility of fine and imprisonment.”

Signature

Date

sites are being met; and

a description of how certain vector attraction reduction requirements are being met.

Reporting Requirements for Surface Disposal Sites

The Part 503 regulation includes reporting requirements only for those Class 1 and 1 mgd or greater facilities described in the first chapter. These facilities must present the information developed for recordkeeping purposes to the permitting authority by February 19th of each year.

Regulatory Requirements for Surface Disposal of Domestic Septage

The regulatory requirements for the surface disposal of septage are not as extensive as those for biosolids. The requirements for surface disposal of domestic septage include meeting the same management practices that are required for the surface disposal of biosolids and one of the vector attraction reduction alternatives 9 to 12 (listed in Table 5-8 and discussed in Chapter Five). Note that vector attraction reduction 12 would require a determination that the pH of the septage had been raised to 12 for a period of 30 minutes. The person who places the domestic septage on the surface disposal site must certify that vector attraction reduction has been achieved (see Figure 3-4) and develop a description of how it was achieved. The certification and description must be kept on file for 5 years.

There are no pathogen requirements for the surface disposal of domestic septage.

FIGURE 3-4
**Certifications Required When Domestic Septage Is
Placed on a Surface Disposal Site**

An individual placing domestic septage on a surface disposal site must retain the following certification statement for 5 years:

“I certify, under penalty of law, that the vector attraction reduction requirements in §503.33(b)(12) have/have not been met. This determination has been made under my direction and supervision in accordance with the system designed to ensure that qualified personnel properly gather and evaluate the information used to determine that the vector attraction requirements have been met. I am aware that there are significant penalties for false certification, including the possibility of fine and imprisonment.”

The owner or operator of the surface disposal site must retain the following certification statement for 5 years:

“I certify, under penalty of law, that the management practices in §503.24 and the vector attraction reduction requirements in [insert §503.33(b)(9) through §503.33(b)(11) when one of those requirements is met] have/have not been met. This determination has been made under my direction and supervision in accordance with the system designed to ensure that qualified personnel properly gather and evaluate the information used to determine that the management practices [and the vector attraction requirements, if appropriate] have been met. I am aware that there are significant penalties for false certification, including the possibility of fine and imprisonment.”

Signature

Date

Common Questions and Answers

Q : What distinguishes long-term storage from surface disposal; for example, for a lagoon in which biosolids are kept for 20 years before eventual use or disposal?

A : If the facility's owner/operator has a plan for final use or disposal, the area may be considered long-term storage rather than disposal.

Q : If biosolids are stored in a lagoon for 20 years and the generator has no intention or ever removing the biosolids from the lagoon, is the lagoon a surface disposal site? If so, what requirement would apply?

A : The facility would be considered a surface disposal site since there is no intent to ever move the biosolids. The lagoon is subject to the surface disposal requirements under Part 503.

Q : How should biosolids from a "closed" surface disposal site be regulated if they are removed from the site and subsequently disposed?

A : Biosolids at a surface disposal site that has been previously "closed" but which is subsequently disturbed or the biosolids relocated are regulated under the section of Part 503 that regulates the subsequent disposal method.

Q : Do the general requirement and management practice exemptions for EQ biosolids extend only to land application? If EQ biosolids are surface disposed, must they meet all surface disposal management practices?

A : The EQ biosolids concept and its exemptions apply only to land application. Biosolids that may meet the requirements for EQ biosolids must still comply with all the requirements under Part 503 if they are sent for disposal at a surface disposal site, municipal solid waste landfill, or biosolids incinerator.

Q : If a liner and a leachate collection system is in place at a site, does its presence constitute compliance with the ground-water protection requirements?

A : If a ground-water scientist certifies that the liner and the leachate collection system will adequately protect ground water, then the ground-water protection requirements are satisfied.

Q: If a site owner claims to have an in situ liner in place, could the permitting authority ask for proof of the impermeability of the native soils?

A: The permitting authority could require verification that the liner's hydraulic conductivity is less than 1×10^{-7} centimeters/second.

Q: Can biosolids be land applied to a surface disposal site after it has been closed?

A: Yes. You can apply CPLR, EQ, or PC biosolids to the site according to the land application provisions of the rule.

Q: Can a surface disposal site be located less than 60 meters from a fault?

A: Yes. A surface disposal site may be located less than 60 meters from a fault if the permitting authority allows it.

Q: Can the permitting authority waive the unstable area prohibition?

A: No.

Q: Is the nitrogen measurement for aquifer contamination taken directly below the surface disposal site?

A: Yes.

Q: With regard to public access restrictions, are hunters allowed to go into a restricted area?

A: The site owner must make a good faith effort (such as posting "no trespassing" signs) to restrict all public access (including hunters), but does not have to physically prohibit all access. The rule does not define restricting access, but EPA never intended that, for instance, the entire site would be ringed in barbed wire.

Q: Can a liner consist of native soils?

A: Yes. A liner can consist of native soils provided the soils meet the permeability requirements of Part 503.

Q: What advice is there for facilities with stockpiles of biosolids that do not meet the ceiling concentration limits?

A: Biosolids must meet the ceiling concentration limits for pollutants in order to be land applied. The owner/operator of such a facility could

take the biosolids to a municipal solid waste landfill, surface disposal site, or a biosolids incinerator, if the biosolids can meet the applicable requirements for that practice. If land application is the preferred practice, the facility could mix its biosolids (containing pollutants above ceiling concentration limits) with other lower-pollutant-level biosolids to meet the ceiling concentration limit requirement.

Q: What if an applier wishes to land apply biosolids to a reclamation site, but the biosolids do not meet the ceiling concentration limit for zinc?

A: The permitting authority may recommend that the biosolids be placed on the reclamation site according to the surface disposal requirements. The permitting authority also might allow crops to be grown under specified conditions for dedicated beneficial use.