NPDES Compliance Inspection Manual

EPA Publication Number: 305-K-17-001
Interim Revised Version, January 2017

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This version of the NPDES Compliance Inspection Manual is released as an interim version in order to allow time for inspectors to use the Manual and provide feedback to EPA's Office of Enforcement and Compliance Assurance (OECA). OECA is interested in user comments that will enhance a future final version of the Manual. In addition, as OECA's efforts with states through E-Enterprise continue, this Interim Revised NPDES Compliance Inspection Manual will inform development of Smart Tools software and hardware for NPDES inspectors to use in the field.

Please send your comments on this Interim Revised NPDES Compliance Inspection Manual to OECA at NPDEScompliance@epa.gov by December 31, 2017.

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Appendix AD –
Animal Industry Overview

OVERVIEW OF LIVESTOCK AND POULTRY INDUSTRY PRACTICES

A. Overview of Livestock Agriculture

The poultry, swine, dairy, and beef industries constitute the principal sectors of U.S. animal agriculture. The vast majority of AFOs that are by definition CAFOs and subject to NPDES permit requirements are in one of these four sectors. A limited number of veal calf, sheep, duck, and horse AFOs are also CAFOs subject to NPDES permit requirements. In this section, we will provide a general overview of the principal sectors, including descriptions of production and waste management practices, with the objective of providing the CAFO inspector with a general understanding of the nature of each of these industries. The production and waste management practices described in this section are those most likely to be encountered at large CAFOs. It is not intended to describe all the possible practices and combinations of practices that may be encountered, since that number is sizable. Thus, CAFO inspectors must expect to encounter operations and practices that are atypical and should seek additional guidance when necessary. The CAFO inspector should feel comfortable asking an operator to clarify or describe an operation, practice, or piece of equipment.

A.1.0 Poultry

The poultry sector has three principal segments: broilers, laying hens, and turkeys. In each of these segments, production and waste management practices are probably more uniform than in the swine, dairy, and beef industries.

A.1.1 Broilers

Broiler refers to a meat-type chicken typically slaughtered at about 7 weeks of age at a live weight of about 5 pounds. This size of bird is the principal product of the broiler sector within the poultry industry. However, there is also some production of younger birds, identified as squab broilers, Cornish game hens or Rock-Cornish crosses, as well as older birds known as roasters. Squab broilers are typically slaughtered at about 4 weeks of age at a live weight of about 2.25 to 2.5 pounds. Roasters are generally slaughtered at about 8 to 10 weeks of age at a live weight of 6 to 8 pounds. Typically, 5 to 6 flocks of broiler chickens will be produced annually. Because squab broilers and roaster boilers differ in the length of their grow-out cycle (the time to reach slaughter weight), more flocks of squab broilers and fewer flocks of roasters are produced annually. Broilers are typically fed corn-soybean-based diets, which may also include various cereal grains and a variety of other ingredients. Grain sorghum may be substituted for corn.

Broiler-type chicken production tends to be vertically integrated with contracts between grower and integrator. The integrator supplies the birds, the feed, and any pharmaceuticals required. The grower supplies the production facility and labor. With vertical integration, the integrator retains ownership of the live birds, but disposal of the manure and dead birds generated is the responsibility of the grower.

A.1.1.1 Broiler Confinement Facilities

Broiler chicken production typically occurs in either totally or partially enclosed structures. Partially enclosed structures have partially open side walls that can be covered by curtains during periods of cold weather. A combination of natural and mechanical ventilation removes heat and moisture from partially enclosed structures. Mechanical ventilation is used with totally enclosed structures, known as controlled environment housing, or, more commonly, tunnel-type housing.

Broiler houses are normally divided into three chambers. One chamber, referred to as the brood chamber, is used to house day-old chicks (biddies). Until the age of about 2 to 3 weeks, chickens are unable to maintain a constant body temperature and require supplemental heat. Thus, brood chambers are heated at the beginning of the grow-out cycle. As the birds grow and heating requirements are reduced, the second and third chambers are opened sequentially to provide more floor space per bird. In cold weather, broiler houses are heated throughout the grow-out cycle to maximize feed conversion efficiency and the rate of weight gain.

A.1.1.2 Broiler Manure Management

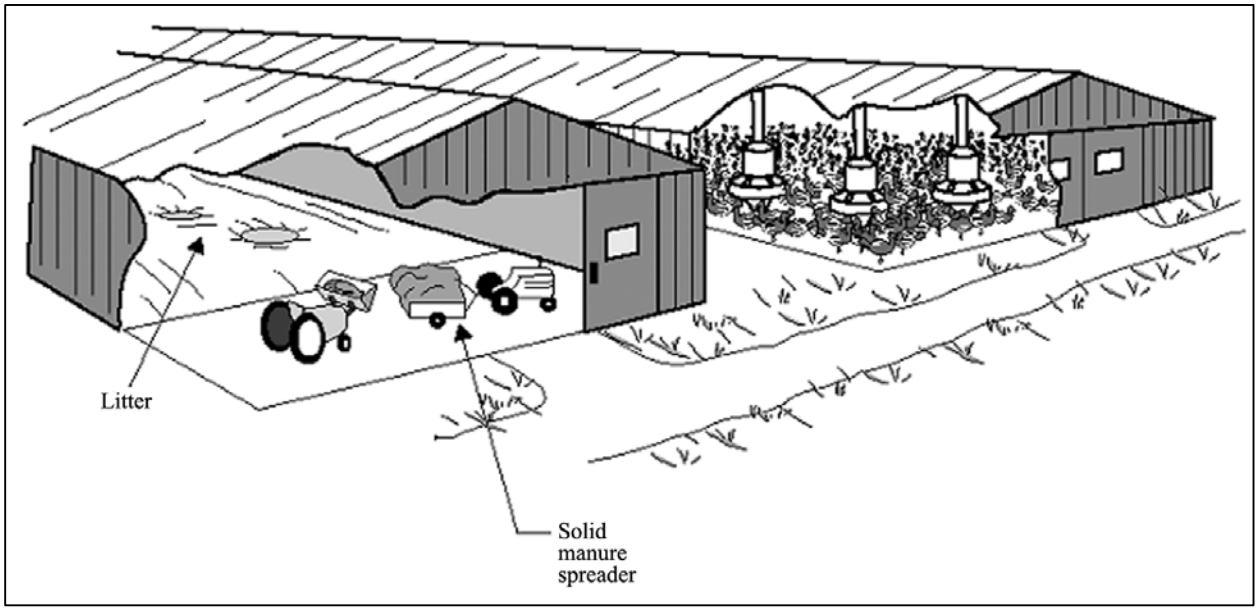
All broiler-type chickens are raised unconfined within the production facility on litter, which has the primary function of absorbing the moisture in the excreted manure. Litter materials vary depending on availability and cost, but they are usually sawdust, wood shavings, peanut hulls, or rice hulls.

Normally, litter and accumulated manure, also commonly called litter, are only removed from the entire house every 1 to 3 years after 5 to 15 or more flocks of birds have been produced. The industry refers to this as a total clean-out. When total clean-outs do not occur on a yearly basis, litter and accumulated manure may be removed annually from the brood chamber. This is known as a brood chamber clean-out. Following both total and brood chamber clean-outs, the litter is replaced.

During each production or grow-out cycle, a material known as crust or cake will form along feeder and water lines. In these areas, the amount of manure excreted is higher than in other areas of the house, and moisture from the manure and waterers tends to bind the mixture of litter and manure together, forming large clumps. As watering systems have improved, the amount of crust formed during each grow-out cycle has decreased. Crust is usually removed after every flock of birds produced. The remaining litter and accumulated manure may be covered (top dressed) with a relatively thin layer of new litter if the amount of crust removed is high. Some poultry operations may use in-house windrowing to treat the cake following each flock, and these poultry operations may only remove cake after several flocks.

Historically, total and brood chamber clean-out litter and crust have been either applied to crop land immediately, if crop production activities permitted, or stored in uncovered piles until land was available for disposal. Over the last several years, structures have occasionally been used to store crust. However, construction cost has generally precluded the use of such storage structures for litter generated by total and brood chamber cleanouts some producers use. The timing of these clean-outs has shifted somewhat from late fall and early winter, as the industry

has become more sensitive to the impact on water quality of litter stored in uncovered piles. It is generally acceptable for litter to be stored under a tarp as long as rain and runoff is diverted around the pile in lieu of constructing covered storage facilities. Temporary short-term stacking of litter (i.e., 2 weeks) on or near a field where it will be applied may also be an acceptable handling method provided manure is applied in a timely manner. For example, Maryland Agriculture Extension allows litter stacked at the field for no longer than two weeks.



Litter System for Broilers and Turkeys (Source: USDA Agricultural Waste Management Field Handbook)

A.1.1.3 Broiler Mortality Management

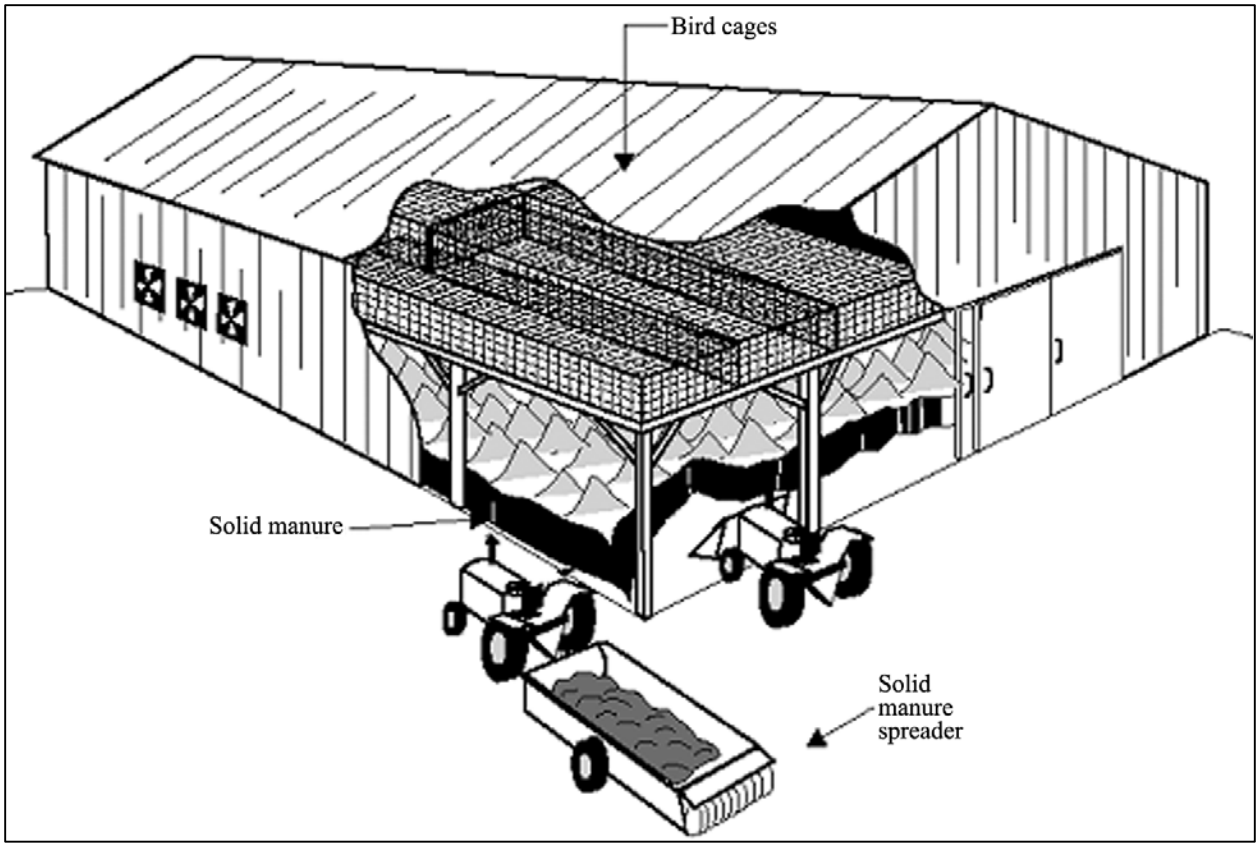
With broilers, the highest rate of mortality normally occurs during the first 2 weeks of the grow-out cycle, but continues at a lesser rate throughout the rest of the cycle. Typically, about 4.5 to 5 percent of the birds housed will die during the grow-out cycle although the typical mortality for roasters is about 8 percent. To prevent the possible spread of disease, dead birds must be removed at least daily, if not more frequently. As mentioned earlier, the disposal of dead birds is the responsibility of the grower. Several options are available for dead bird disposal. Composting is one of the more desirable approaches and has been heavily promoted by the industry. As an alternative to composting or burial, at least one integrator has been distributing freezers to preserve carcasses for subsequent disposal by rendering.

Catastrophic losses of broiler chickens also occur, especially during periods of extremely hot weather but also during weather events such as hurricanes, tornadoes, and snow or ice storms. Catastrophic losses of broilers from excessive heat are usually more severe with older birds. Several options are available for disposal of catastrophic losses, with burial being the most common practice. (Note that burial is prohibited or highly regulated in some states.) Large-scale composting is another, and probably more desirable, option from a water quality perspective.

A.1.2 Laying Hens

A laying hen is a chicken maintained for table egg production. The production cycle begins with the placement of young birds, normally 14 to 16 weeks of age, in the production facility and ends 11 to 12 months later when the birds are removed. These birds, known as spent hens, may be slaughtered for meat for human or pet foods or disposed of by rendering. More than three-fourths of layer farms molt their birds followed by a second period of egg production. Routine molting by withholding or restricting feed is the most common method. Placement and removal of birds are on an "all in–all out" basis. Typically, laying hens are also fed corn- and soybean-based diets, which may also include various cereal grains such as wheat and barley and a variety of other ingredients.

Although the table egg segment of the poultry sector is less vertically integrated than the broiler sector, vertical integration is becoming more common. However, the egg producer is typically responsible for both manure and dead bird disposal if under contract with an integrator or an independent operator. Slightly more than 10 percent of all layer farms have pullet raising facilities on the farm. Pullets are young chickens, usually less than 20 weeks of age, often raised for the purpose of egg production. Traditional pullet houses are similar in construction to broiler houses.



Traditional "High-Rise" House for Layers (Source: USDA Agricultural Waste Management Field Handbook)

A.1.2.1 Laying Hens Confinement Facilities

Most egg production occurs in totally enclosed facilities with mechanical ventilation for temperature control and moisture removal, but partially open-sided houses may be encountered in warm climates. Unlike broilers, laying hens are usually confined in cages and no litter or bedding material is used. However, modern changes in the layer industry are resulting in more diverse housing arrangements, including larger cages, designs with "enriched housing" where hens can freely move within a large cage from laying areas to perches to scratching areas, and designs that allow hens to fly between the floor of the barn to multiple levels in the building for perching and laying.

A.1.2.2 Laying Hens Manure Management

Manure produced by laying hens is handled both as a liquid or slurry and as a solid, with handling as a solid being much more common. Liquid or slurry systems are more common in older production facilities. When laying hen manure is handled as a liquid or slurry, flushing or scraping is used to remove manure from the production facility. With scraping systems, a tank or an earthen structure is often used for storage if the manure is not applied directly to crop land, while flush systems use an anaerobic lagoon for stabilization and storage. Typically, the lagoon is the source of the water used for flushing, although fresh water may be used in rare instances.

Traditionally, to handle laying hen manure as a solid, a two-story production facility, known as a high-rise house, is used. In a high-rise house, the caged hens are located on the second floor of the building, with the manure dropping to the first floor where it is dried and stored. The primary factor responsible for drying is biological heat production in the accumulating mass of manure that causes evaporation of the moisture in the manure. Ventilation systems for high-rise houses are designed to move air from intakes along the eaves of the house roof down through the caged hens and over the mass of accumulating manure before exiting the house, thus removing the moisture evaporated from the manure. Critical to the successful operation of a high-rise house is the avoidance of leaks in the bird watering system and proper exterior grading to direct surface runoff away from the building. Because of the microbial activity in the accumulating mass of manure, which is responsible for the heat generated and the evaporation of manure moisture, stabilization occurs and storage for 1 or more years is provided. Typically, manure is removed from high-rise houses yearly between flocks of hens, but storage for 2 to 3 years is possible.

Modern housing for laying hens, and the type that is currently most often built, is a "manure-belt" system where the manure from caged hens drops onto conveyor belts that move through the house and transport the manure into a separate drying unit or storage structure. The manure may be dried for easier storage or transportation. This housing design and manure management system is beneficial for the health of the birds, as the air quality is improved by the removal of the litter.

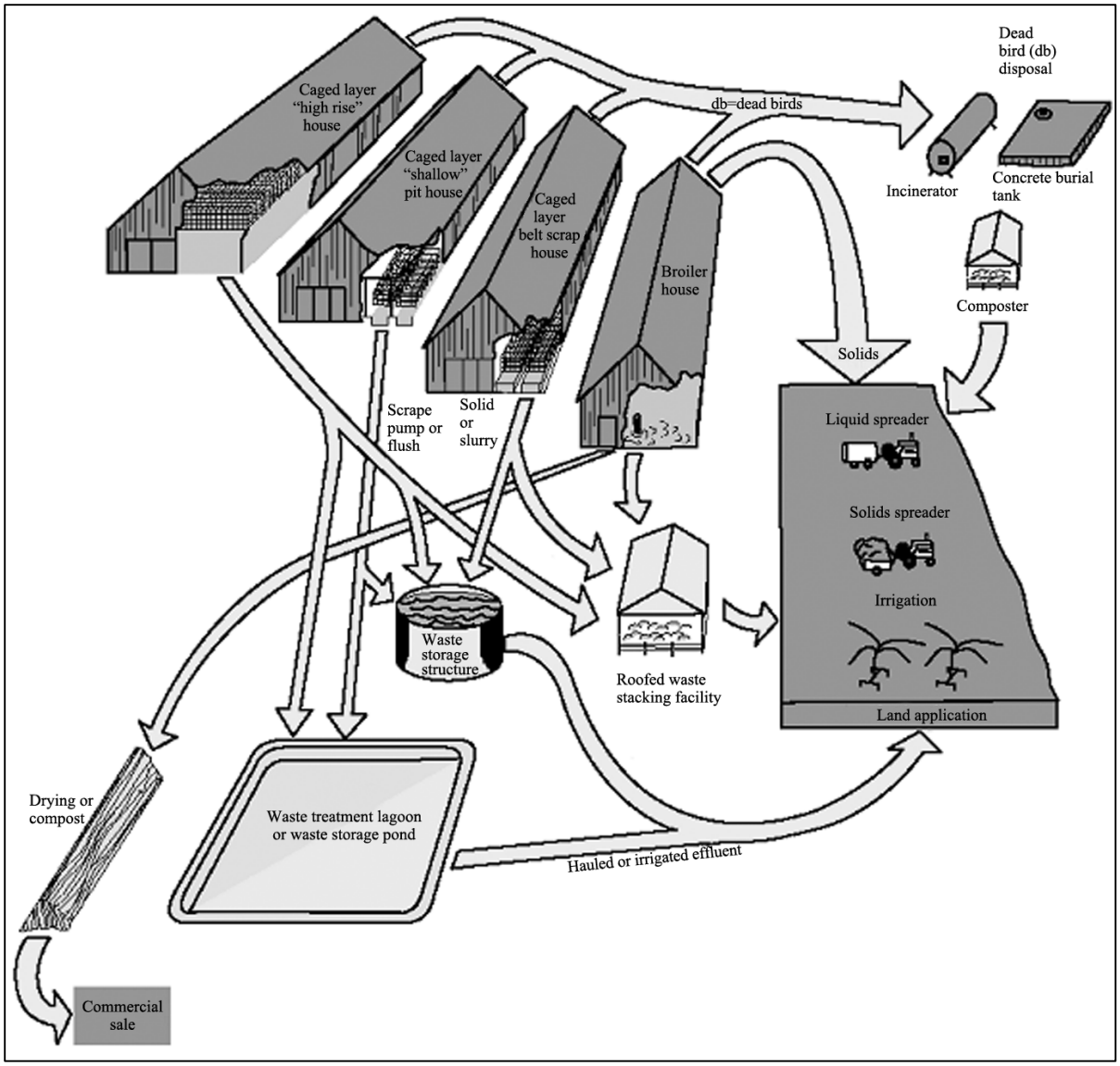
The majority of eggs marketed commercially in the U.S. are washed using automatic washers. Cleaning compounds such as sodium carbonate, sodium metasilicate, or trisodium phosphate, together with small amounts of other additives, are commonly used in these systems. Wash water is contaminated with shell, egg solids, dirt, manure, and bacteria washed from the egg

surface into the recycled water. Eggs may be washed either on farm or off farm. Over three-fourths of layer farms process eggs on farm, though one-third of the largest farms are likely to wash eggs off farm. Operations that wash their eggs on farm may do so in-line or off-line. Larger operations commonly collect and store egg wash water on-site in large tanks or lagoons for treatment and storage.

A.1.2.3 Laying Hens Mortality Management

It can be expected that about 1 percent of the started pullets housed will die each month through the laying cycle. To prevent the possible spread of disease, dead birds should be removed from cages daily, if not more frequently. As mentioned earlier, disposal of dead birds is the responsibility of the grower. Several options are available for dead bird disposal. Of these options, composting is one of the more desirable approaches.

Catastrophic losses of laying hens also occur. Loss of power and mechanical ventilation during periods of extremely hot weather is the most common cause of loss. Weather events such as hurricanes and tornadoes can also cause catastrophic losses. Several options are available for the disposal of catastrophic losses, with burial being the most common. (Note that burial is prohibited or highly regulated in some states.) Large-scale composting is another, and probably more desirable, option from a water quality perspective.



Poultry Waste Handling (Source: USDA Agricultural Waste Management Field Handbook. Note that burial is prohibited or highly regulated in some states.)

A.1.3 Turkeys

Turkey production is similar to broiler chicken production in many respects. The grow-out period for female or hen turkeys is usually about 14 to 16 weeks, resulting in a live weight at slaughter of between 13 and 20 pounds. However, the usual grow-out period for toms or male turkeys is longer, ranging from 17 to 21 weeks, resulting in a live weight at slaughter of between 30 and 37 pounds. Typically, two flocks of turkeys are produced annually because of the longer grow-out cycle and the somewhat seasonal demand for turkey. Turkeys are primarily fed corn- and soybean-based diets, which may also include various cereal grains and a variety of other ingredients.

Vertical integration is also extensive in the turkey sector of the poultry industry, with the same distribution of responsibilities between the integrator and grower as in the broiler sector.

A.1.3.1 Turkey Confinement Facilities

Like broiler production, essentially all turkey production occurs in partially or totally enclosed facilities that are divided into two or three chambers. Initially, only one chamber, also known as the brood chamber, is used; this is the area where the newly hatched turkeys, known as poults are placed. Like broiler chicks, poults are unable to maintain a constant body temperature until about 6 to 8 weeks of age and thus require supplemental heat. Brood chambers for turkeys, therefore, are also heated at the beginning of the grow-out cycle. As with broiler chickens, the second or the second and third chambers are opened to provide more floor space per bird as the birds grow. In cold weather, some heat may be provided throughout the grow-out cycle.

Some turkey producers use separate brood and growing houses and move the birds from the brooding house to the growing house after about 6 to 8 weeks. Another production practice is to use the brood chamber in a house exclusively for brooding and use the remainder of the house for grow-out after the birds reach the age of 6 to 8 weeks. These management systems are known as two-age management systems. Such systems produce more flocks each year than single-age farms.

A.1.3.2 Turkey Manure Management

Turkeys are raised unconfined in the production facility on litter, typically sawdust or wood shavings. Total clean-out of brood chambers and brood houses after each flock is common, as is total clean-out of growing chambers or houses annually. Crust removal between flocks followed by top dressing with new litter also occurs in the production of turkeys.

In the turkey sector, the use of litter sheds to store crust and total clean-outs from brood chambers or brood houses is also emerging. When land is not available for disposal, storage of these materials in uncovered piles is common.

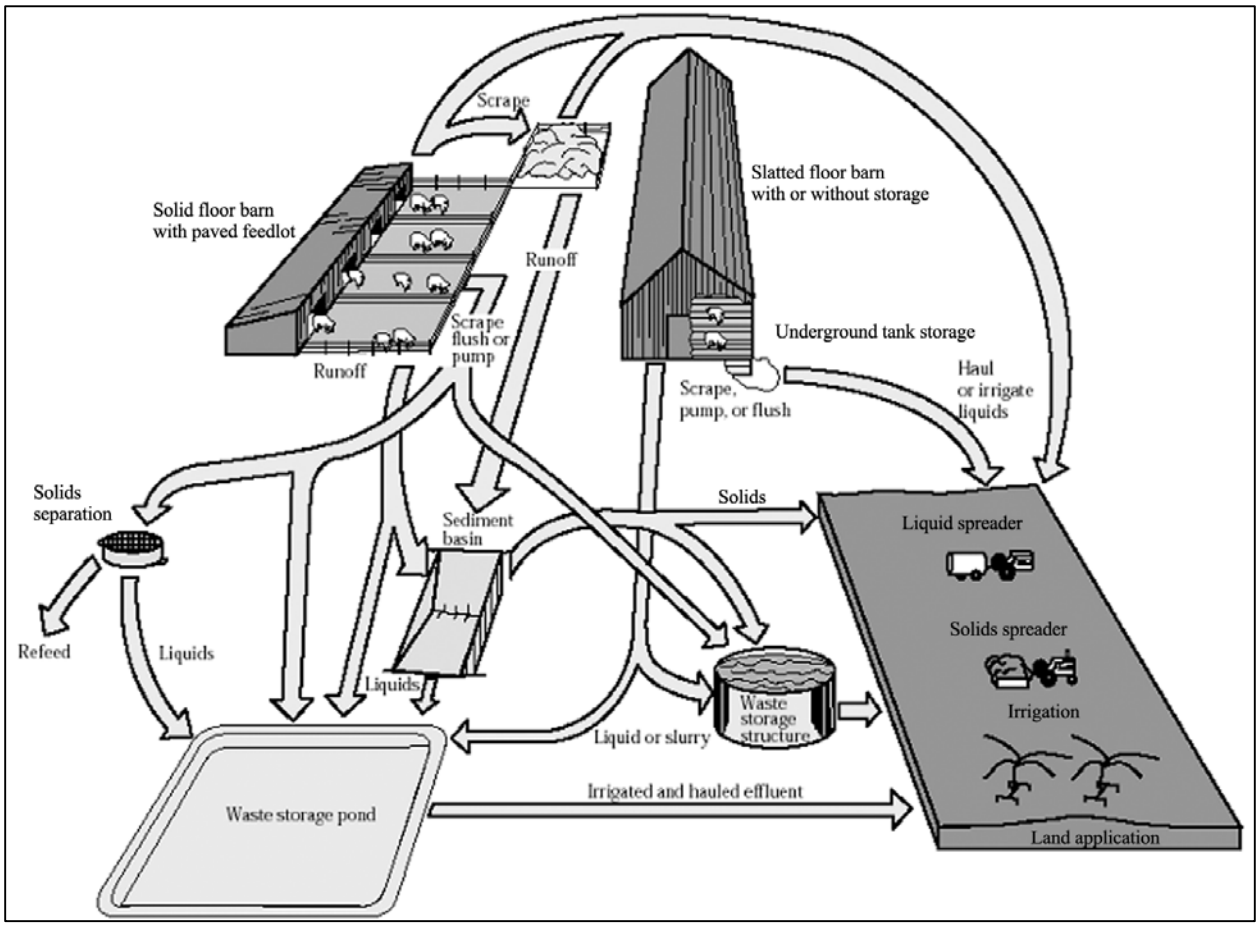
A.1.3.3 Turkey Mortality Management

Typically, about 5 to 6 percent of hens and 9 to 12 percent of toms will die during the grow-out cycle, with the highest rate of loss occurring during the initial weeks. As with broilers and laying hens, dead birds should be removed daily, if not more frequently, with dead bird disposal being the responsibility of the grower. Again, several options for dead bird disposal are available; composting is one of the more desirable approaches from a water quality perspective.

Catastrophic losses of turkeys occur during periods of extremely hot weather, but they may also be due to weather events such as hurricanes, tornadoes, and snow or ice storms. Older turkeys, like older broilers, are more susceptible to catastrophic losses during periods of extremely hot weather. Several options are available for disposal of catastrophic losses, with burial being the most common practice. (Note that burial is prohibited or highly regulated in some states.) Large-scale composting is another, and probably more desirable, option from a water quality perspective.

A.2.0 Swine

The production cycle for hogs has three phases. It begins with gestation and farrowing (birth). After farrowing, the newly born pigs or piglets are normally nursed for a period of just under 3 to 4 weeks until they reach a weight of 10 to 15 pounds. The average pig weaning age is 17 days, but may approach 4 weeks at smaller operations. Over 97 percent of large farms wean at less than 21 days. The production phase after weaning is known as the nursery phase where pigs are fed a starter ration until they reach a weight of 40 to 60 pounds. At this point, they are 8 to 10 weeks of age. The average age for leaving the nursery is 63 days. The third phase of swine production is the growing-finishing phase in which the gilts (young females) and young castrated boars (males) not retained for breeding are fed until they reach a market weight, typically between 240 and 280 pounds. In this phase of swine production, hogs are fed a growing ration until they reach 120 pounds in weight, which is then followed by a finishing ration. Growing-finishing usually takes between 15 and 18 weeks. Hogs are normally slaughtered at about 26 weeks of age. After weaning, swine are typically fed a corn- and soybean-meal based diet which may include small grains such as wheat and barley and other ingredients until slaughtered.



Swine Waste Handling (Source: USDA Agricultural Waste Management Field Handbook. Note that burial is prohibited or highly regulated in some states.)

Swine operations can be of several types. The most common is the farrow-to-finish operation that encompasses all three phases of swine production. Other operations specialize in either feeder pig production or the growing-finishing phase of swine production. Although not common, specialization in either the gestation-farrowing or the nursery phase of the swine production cycle may also occur. Larger grow-finish operations are more likely to obtain feeder pigs from off-site sources. Vertical integration is becoming more common in the swine industry.

A.2.1 Swine Confinement Facilities

The swine industry uses confinement systems ranging from pasture without and with shelters to total confinement, where pigs are confined in pens or stalls. Open paved or unpaved lots with access to a building or huts for shelter are also used, but larger operations will use total confinement 99 percent of the time because of higher feed conversion efficiency and weight gain as well as lower labor costs.

Total confinement facilities for swine are similar in many respects to facilities used for broiler production, except that the pigs are confined in pens. These pens may be totally enclosed or they may have partially open side walls that can be closed with curtains during cold weather. Totally enclosed facilities are mechanically ventilated, whereas facilities with partially open side walls use a combination of natural and mechanical ventilation.

A.2.2 Swine Manure Management

Four principal types of waste management systems are used with total confinement housing in the swine industry: deep pit, pull plug pit, pit recharge, and flush systems. The deep pit, pull plug pit, and pit recharge systems are used with slatted floors, whereas flush systems can be used with either solid or slatted floors.

Deep pits are normally sized to collect and store 6 to 8 months of waste. When they are emptied, the accumulated manure may be disposed of directly by land application or transferred to either storage tanks or earthen storage ponds for later disposal by land application.

Pull plug pit systems use relatively shallow pits to collect manure. These pits are usually drained to a storage tank or an earthen storage pond every 1 to 2 weeks.

Pit recharge systems also use relatively shallow pits that are drained periodically to an anaerobic lagoon. Although the frequency of draining varies, between 4 and 7 days is standard. After the pit is drained, the empty pit is partially refilled with supernatant from the anaerobic lagoon, which differentiates this system from the pull plug pit system—hence, the name pit recharge.

Flush systems use either fresh water or, more commonly, supernatant from an anaerobic lagoon to transport accumulated wastes to that lagoon daily or more frequently. Because pigs will defecate as far away from their feeding and resting areas as possible, facilities with solid floors will usually have a flush channel formed in that area. Facilities with slatted floors usually form a series of parallel flush channels in the shallow pit under the slatted floor.

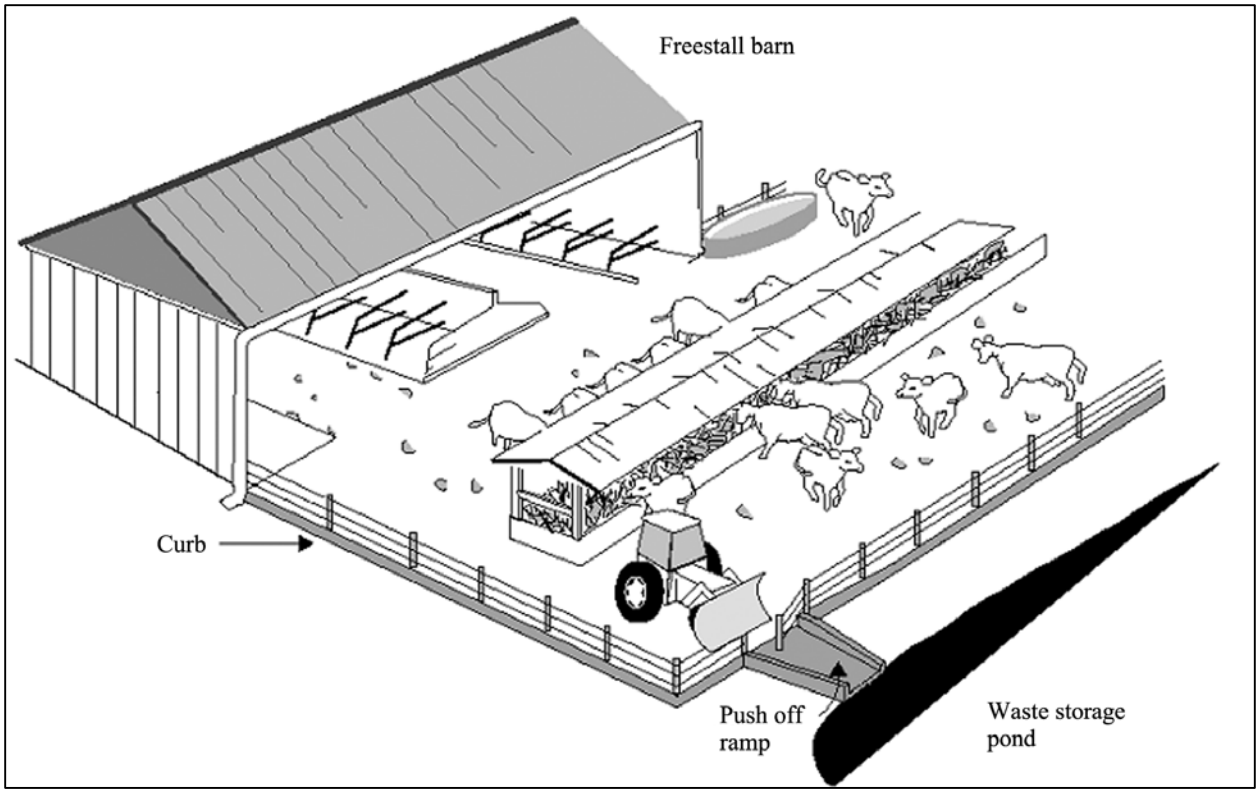
A.2.3 Swine Mortality Management

In swine production, the highest rate of mortality occurs in young piglets within 3 to 4 days of birth. Typically, about 10 to 12 percent of piglets will die before weaning. Typically, 2 to 4 percent of the pigs die during the nursery stage and during the grow-finish stage. Several approaches are used for dead pig disposal, with burial being the most common. Composting and incineration are also used but primarily for piglets. Although older pigs can be disposed of by composting, disposal through rendering is the more common alternative to burial.

Catastrophic losses of swine also occur but they are primarily due to extreme weather events such as hurricanes, tornadoes, and the like. Heat losses are less common in the swine industry, because pigs, unlike birds, possess sweat glands that help to regulate body temperature. The primary effects of periods of high temperatures on swine production are reduced feed conversion efficiency and a reduced rate of weight gain. Burial is a practical option for the disposal of large numbers of swine carcasses, although rendering could be feasible as well. (Note that burial is prohibited or highly regulated in some states.)

A.3.0 Dairy Cattle

The production cycle in the dairy industry begins with the birth of a calf, which causes the onset of lactation or milk production. A period of between 10 and 12 months of milk production is normally followed by a 2-month dry period to allow for physiological preparation for calving. At the time that milking is normally stopped, a cow will be in the seventh month of a 9-month pregnancy. Thus, a mature dairy cow produces a calf every 12 to 14 months. This frequency of calf production is necessary to maintain a cost-effective level of milk production. Average U.S. milk production is about 17,000 pounds per cow per year. However, herds with averages of 22,000 to 24,000 pounds of milk per cow per year or higher are not unusual.



Dairy Confinement Area (Source: USDA Agricultural Waste Management Field Handbook)

About 25 percent of a milking herd is typically replaced each year, but replacement levels can be as high as 40 percent for intensively managed herds. Mature cows are replaced or culled for a variety of reasons, including low milk production and diseases such as mastitis, which is an infection of the udder. Lameness, injury, belligerence, and reproductive problems are also reasons for culling. Nearly all culled dairy cows are slaughtered for beef used in processed foods or in higher quality pet foods.

Roughly 50 percent of the calves produced by dairy cows are bulls unless the livestock producer is using sexed semen (to produce more heifer calves). Because most dairy cows are bred using artificial insemination, the industry has little demand for bull calves. Although some dairy farms will have one or more breeding age bulls for cows that will not conceive by artificial insemination, most bull calves are sold for either veal or beef production.

Because of the continuing need for replacement cows, approximately 50 percent of the female calves born are raised as replacements. Those animals selected as replacements are usually progeny of cows with a record of high milk production. Female calves not raised as replacements are also sold for either veal or beef production.

Female calves retained as replacements are either raised on-site or transferred off-site to an operation that specializes in producing dairy cattle replacements. In this second scenario, the calves may be sold to the replacement operation with the same or other animals purchased back at a later date or raised under contract. In the dairy industry, both male and female animals are called calves up to an age of about 5 months. From the age of 6 to 24 months,

females are called heifers, with first calving typically occurring at 24 months of age. Replacements raised off-site may be purchased or returned either as unbred or open (not pregnant) heifers at an age of about 13 months or as bred heifers at an age usually of 22 to 23 months. Three groups of animals will be present on dairy farms that raise replacements on-site: calves, heifers, and mature lactating and dry (mature nonlactating) cows. Usually, the total number of calves and heifers present will be between 50 and 60 percent of the size of the milking herd.

Lactating dairy cows are milked at least twice per day, but milking three times a day has become more common, especially with higher milk producing herds. With the exception of young calves until weaning, dairy cattle are fed a roughage-based diet or ration composed primarily of silages and hays supplemented with feed grains and by-product feedstuffs to ensure adequate levels of energy, protein, minerals, and other essential nutrients. Citrus pulp, beet pulp, meat and bone meal, and cottonseed meal are examples of by-product feedstuffs. Young calves are initially fed colostrum, which is the milk produced during the first 4 to 5 days after calving that cannot be marketed, and then a milk replacer until weaning and a complete shift to a roughage-based ration.

A.3.1 Dairy Confinement Facilities

The free-stall barn is the predominant type of housing system used on larger dairy farms for lactating cows. In a free-stall barn, cows are commonly grouped by stage of lactation in large pens with free access to feed bunks, waterers, and stalls for resting. The standard free-stall barn design has a feed alley in the center of the barn separating the two feed bunks on each side. Each side of the barn has an alley between the feed bunk and the first row of free-stalls and an alley that extends between the first row of free-stalls facing the feed bunk and a second row of free-stalls facing the side wall of the structure. These are the primary areas of manure accumulation, with little manure defecated in the free-stalls. There may or may not be access to an outside dry lot for exercise or to a pasture for exercise and grazing. In warmer climates, cows may simply be confined in a dry lot with unlimited access to feed bunks, waters, and usually an open structure to provide shade.

With both free-stall barns and dry lot production facilities, milking occurs in a specialized facility known as a milking center. A milking center has three components: a holding area where cows are held prior to milking, a milking parlor where the cows are milked, and an area where milk is stored in refrigerated tanks, known as bulk tanks, until picked up for processing and the milking equipment is cleaned. Holding areas may be either enclosed or open areas depending largely on climate.

There are two predominant housing systems for young unweaned calves: individual pens in an enclosed building and hutches that tend to reduce disease problems. Hutches are small, lightweight structures, typically of fiberglass or plywood construction, that can be easily moved. Individual hutches, sized for one calf, are located in a small fenced area to provide shelter from inclement weather as well as access to fresh air and sunlight. Hutches are routinely relocated to reduce disease transmission. Older calves are either housed in pens as groups in a totally or partially enclosed building or in portable super hutches in a small fenced area.

Heifers are most commonly raised on dry lots with or without shelter, but may also be raised on pasture or in dedicated free-stall barns. Dry cows may be removed from the milking herd to dry lots, pasture, or dedicated free-stall barns.

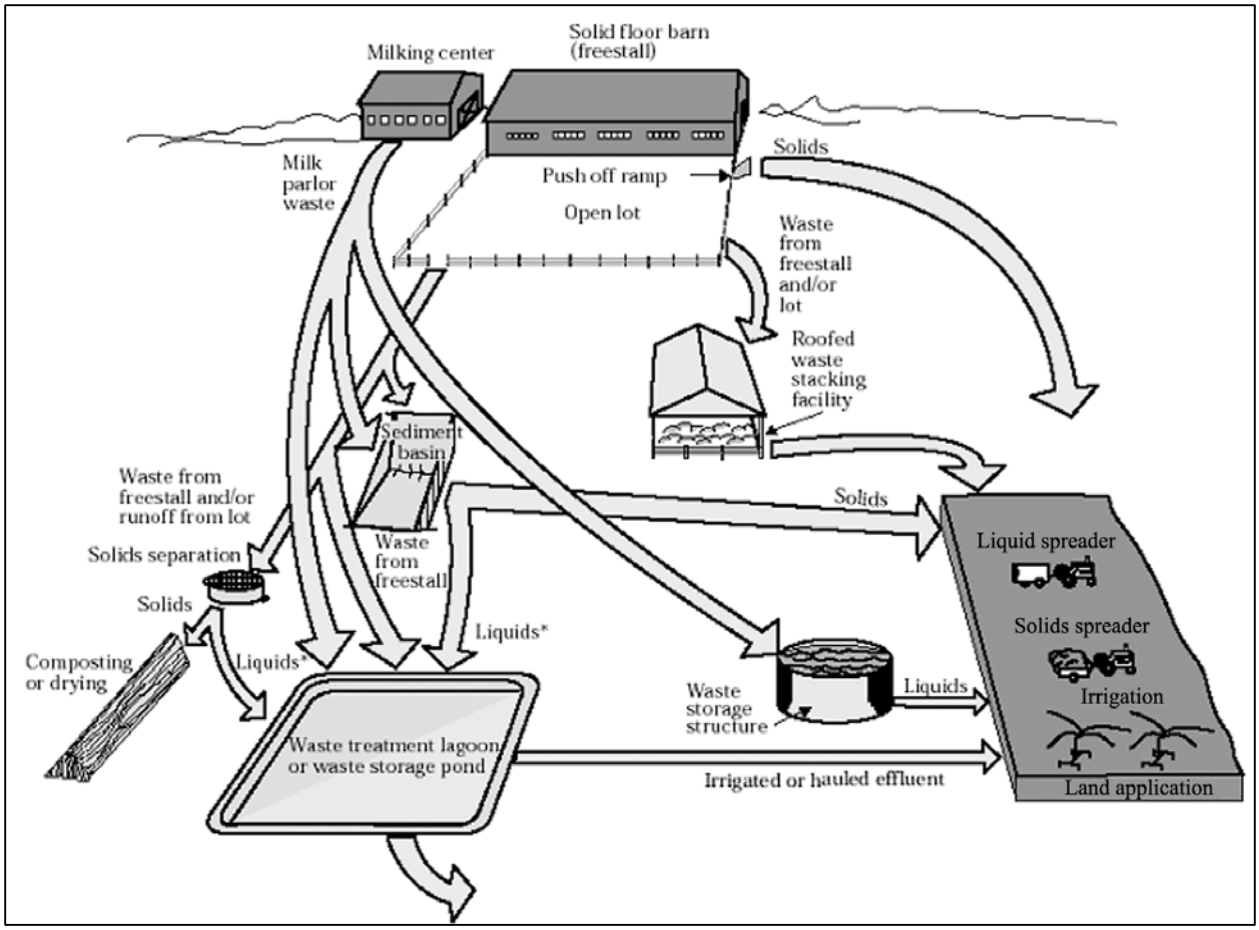
A.3.2 Dairy Manure Management

Manure is usually removed from free-stall barn alleys at least twice daily, and often more frequently, by either scraping or flushing. A mechanical scraper or a tractor-mounted blade is used to move the manure to a collection pit at one end of the barn. From the collection pit, manure is transferred by pump or gravity to a tank or an earthen pond for storage until disposal by land application. Milking center wastewater may be added to these collection pits to facilitate pumping or gravity flow, since scraped dairy cow manure is quite viscous with a total solids content of around 12 to 13 percent. With scrape systems, other options for managing milking center wastewater, which is generated when the milking parlor and milking equipment are cleaned, are transfer directly into the manure storage structure or transfer to a dedicated lagoon.

Flush systems are the most common in warmer climates where flush water is unlikely to freeze. Flush systems for dairy cattle operate like flush systems for swine and laying hens, with the manure and flush water discharged into an anaerobic lagoon, which is normally the source of the water used for flushing. With flushing systems, milking center wastewater usually is transferred to the lagoon used for manure stabilization and storage.

The type of manure management used by a particular dairy is often a function of the bedding choice for the lactating cows. Common bedding materials include sand, sawdust, rubber mattresses, and water beds. As sand is very abrasive on manure pumps, flush systems are rarely used when sand is the chosen bedding material.

When sand bedding is used, it accumulates in the waste storage facility and must be eventually mechanically removed every several years or else the volume of available manure storage becomes greatly diminished. Some larger dairies will install sand removal systems, typically either a sand lane (gravity removal of sand with flush systems) or a mechanical sand separation system consisting of a cyclone filter or screw auger. Both systems require a high volume of flush water which is usually secured from the waste storage pond.



Dairy Waste Handling (Source: USDA Agricultural Waste Management Field Handbook) (Note that burial is prohibited or highly regulated in some states.)

In the nation's southern and western states dry lots are more common than the totally enclosed free stall barns common in the Midwest. Manure accumulations on dry lots for lactating cows are typically removed by scraping with a tractor-mounted blade and handled as a solid, similar to the beef feedlot industry. Areas by feed bunks may be scraped daily, with longer intervals between manure removals in other areas of the lot. Areas by feed bunks may also be flushed. Manure accumulations in dry lots used for heifers and dry cows are usually removed by scraping and are handled as a solid. If manure removed from dry lots by scraping is not land applied immediately, it is stored by stacking on a section of the lot or at a separate site. Calf and heifer manure may be transferred from a scraped free-stall barn to the storage structure used for manure, or the lagoon used for flushed manure, or it may be handled as a solid, depending on the methods of calf and heifer confinement and the handling system used for the manure from the lactating cows.

Dry lots should have runoff collection and retention basins to prevent the discharge of manure-contaminated runoff to adjacent surface waters.

Treatment of the manure before land application using large anaerobic digesters (AD) will be seen more frequently on CAFOs, thanks in part to the work of EPA's Ag STAR program. These

large anaerobic digester vessels can be either completely in-ground or above-ground but in either case the goal is the same – to create electricity or compressed natural gas using the biogas that develops naturally when the temperature of the manure is raised. The typical retention time for the manure is 21 days or less. Livestock producers like the benefits of ADs such as odor reduction, pathogen reduction, and easier transport of the manure nutrients to the field, such as with center pivots (ability to pump depends on the amount of solid separation completed by the treatment system.) See EPA's Ag STAR website for more information at: https://www.epa.gov/agstar

As cattle manure is rather weak in terms of its energy production potential, most ADs will import substrate material to boost the energy production. Common substrate materials include waste food, grease, food processing wastes, etc. The addition of a substrate material increases the energy production and decreases the payback period for the initial investment.

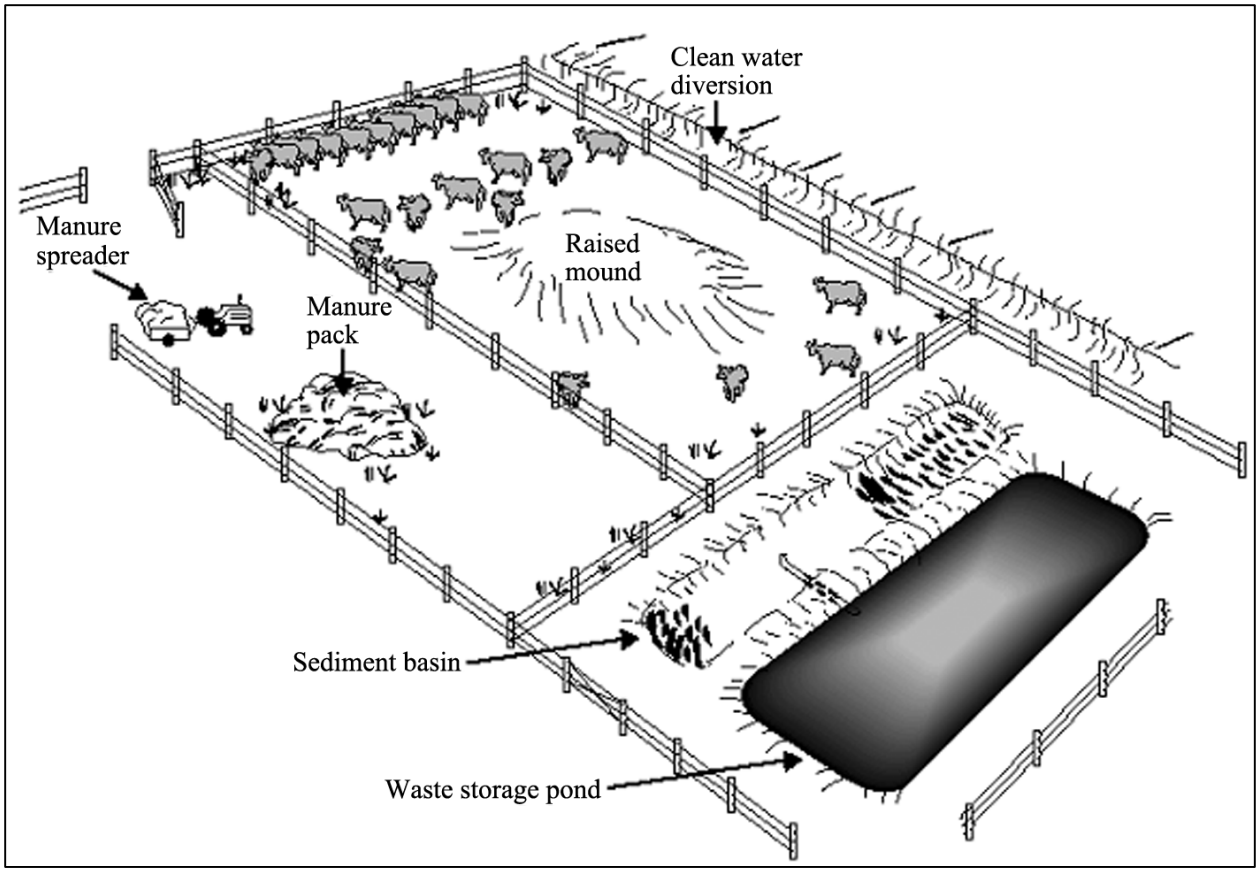
It is not uncommon for large dairy CAFOs to have their AD systems operated by a third party.

A.3.3 Dairy Mortality Management

Although the frequency of mortality in the dairy industry is much less than in the poultry and swine industries, deaths do occur. Usually, carcass disposal is by rendering, with burial being the only other realistic option if no rendering facility willing to accept dead animals is located within a reasonable distance of the farm. (Note that burial is prohibited or highly regulated in some states.) Carcass composting is also an option, particularly for the disposal of young calf carcasses, but can be done with adult animals too if the compost operation is properly sized and managed.

A.4.0 Beef Cattle

There are three different types of operations in the beef industry, with each type corresponding to a different phase of the production cycle. The first is the cow-calf operation that is the source of the heifers and steers (castrated males) fed for slaughter. Cow-calf operations typically maintain a herd of yearling heifers, brood cows, and breeding bulls on pasture or range land to produce a yearly crop of calves for eventual sale as feeder cattle. In colder climates and during drought conditions, cow-calf operations using pasture or range land will provide supplemental feed, primarily hay but also some grain and other feedstuffs. Confinement on dry lots is also an option used in some cow-calf operations when grazing will not satisfy nutritional needs. Although pasture or range-based cow-calf operations are most common, operations that exclusively use dry lots may be encountered. In colder climates, cow-calf operations may have calving barns allowing cows to calve indoors to reduce calf mortality.



Beef Feedlot Waste Collection (Source: USDA Agricultural Waste Management Field Handbook)

The second type of operation in the beef industry is known as a backgrounding or stocker operation. These operations prepare weaned calves for finishing. Backgrounding operations may be pasture or dry-lot based, or some combination thereof. Relatively inexpensive forages, crop residues, and pasture are used as feeds, with the objective of building muscle and bone mass without excessive fat at a relatively low cost. The length of the backgrounding process may be as short as 30 to 60 days or as long as 6 months. The duration of the backgrounding process and the size of the animal moving on to the finishing stage of the beef production cycle depend on several factors. High grain prices favor longer periods of backgrounding by reducing feed costs for finishing or fattening, while heavier weaning weights shorten the finishing process. Backgrounded beef cattle may be either sold to a finishing operation as “feeder cattle,” usually at auction, or raised under contract with a finishing operation. It is common for large finishing operations to have cattle backgrounded under contract to ensure a steady supply of animals. In some instances, cow-calf and backgrounding operations will be combined.

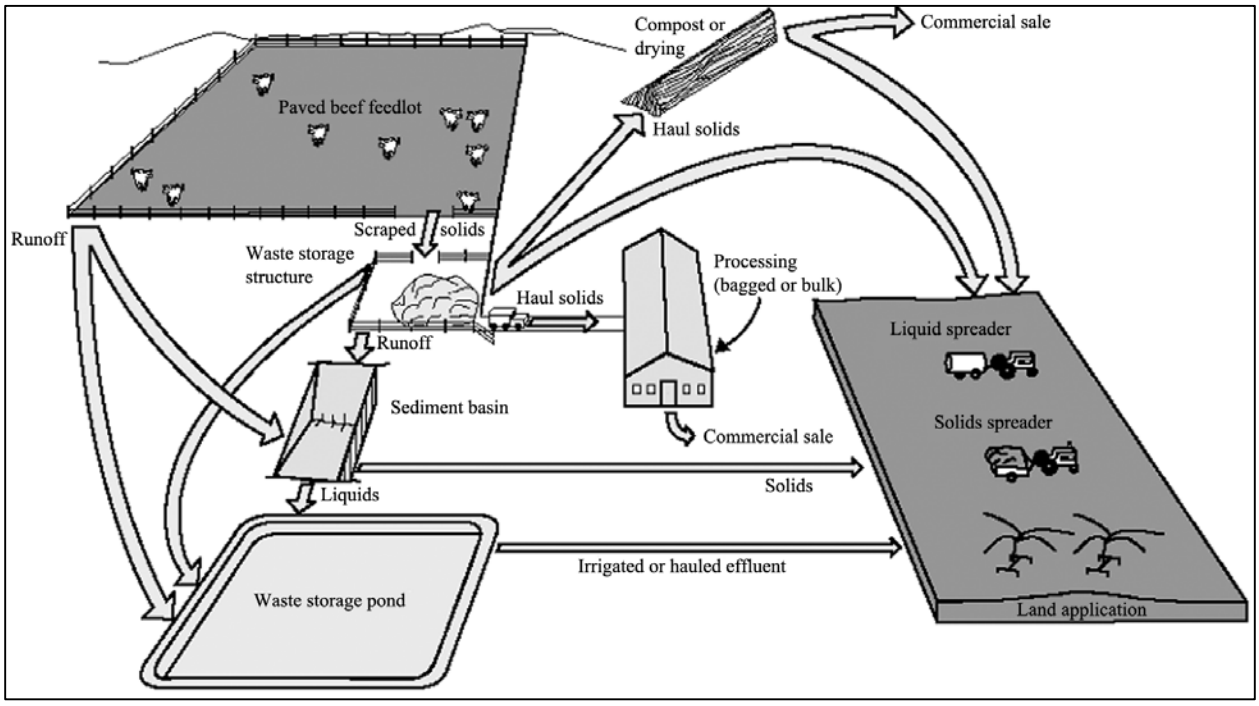
The final phase of the beef cattle production cycle is the finishing or feedlot phase where a high energy, grain-based ration with only a small amount of roughage is fed to produce rapid weight gain and desirable carcass characteristics. The larger commercial finishing operations usually feed a complete ration that is a mixture of feed grains, roughage, and other ingredients. Usually, the finishing phase begins with 8 to 9-month old animals weighing about 700-800 pounds. Somewhere between 150 and 180 days, these animals will reach the slaughter weights

of 1,250 to 1,350 pounds for heifers and 1,350 and 1,450 pounds for steers, and a new finishing cycle begins. Some feedlot operators will immediately start with younger animals weighing about 275 pounds or older and heavier animals. This will either extend the finishing cycle to about 270 days or shorten it to about 100 days. Beef cattle in the finishing phase are known as "cattle on feed." Finished cattle are "fed cattle."

A.4.1 Beef Confinement Facilities

In addition to pasture or range-based cow-calf and backgrounding operations, beef cattle may be raised on unpaved or partially paved open lots or in bedded and slatted confinement barns with pits. When feedlots and dry lots on cow-calf and backgrounding operations are partially paved, it is the areas around feed bunks and sources of drinking water that will be paved. These are high animal traffic areas and have high rates of manure accumulation.

A typical beef cattle feedlot is divided into a series of large pens to allow animals to be grouped by age. In each pen, there are feed bunks, sources of drinking water, and probably shaded areas in warm climates. Feed bunks located along one side of a pen are known as fence line feed bunks, and feed is delivered with specially equipped trucks or tractor-drawn feed wagons from a feed alley. Mechanical feed bunks may be located in the center of a pen or used as a divider between two pens. Although mechanical feed bunks allow cattle to feed on both sides of the feed bunk, their use is generally limited to smaller operations. Feed bunk space per head is an important parameter in beef cattle feedlot design. The large commercial feedlots may also have a feed mill and an area for treating sick animals.



Beef Waste Handling (Source: USDA Agricultural Waste Management Field Handbook. Note that burial is prohibited or highly regulated in some states.)

A.4.2 Beef Manure Management

Manure produced by beef cattle on open lots is primarily handled as a solid, with removal by scraping and storing the collected manure in mounds on the lot. Manure accumulation is typically highest around feed bunks and sources of drinking water. The complete removal of manure from open lots used for beef cattle production may only occur annually during summer months to take advantage of natural drying to facilitate handling as a solid.

Open lots for beef cattle should also have runoff collection and retention basins to prevent the discharge of manure-contaminated runoff to adjacent surface waters.

A.4.3 Beef Mortality Management

As in the dairy industry, the frequency of mortality in the beef cattle industry is much lower than in the poultry and swine industries; however, deaths do occur. Carcass disposal by rendering is the primary option. Additionally, composting may be used to manage mortalities. Given the size of most beef cattle operations, burial cannot generally be considered a realistic alternative in the context of water quality protection.

A.5.0 Land Application of Manure

Livestock and poultry manures have value as sources of plant nutrients for crop production. Historically, livestock or poultry production and crop production have been integrated activities. As animal production units have been consolidated into fewer but larger operations, a decoupling of animal and crop production activities has gradually occurred. As a result, some livestock and poultry producers do not have adequate land under their ownership or direct control for the proper utilization of all the manure that is generated. In this case, producers may sell or give away manure to nearby crop farmers.

Manure handled as a solid, such as broiler, turkey, and solid cattle feedlot manure, is typically surface applied to cropland using either tractor-drawn or truck mounted box-type manure spreaders. To reduce potential pollutant transport in surface runoff, disking or plowing may follow application to incorporate the manure into the soil. Manure handled as a semi-solid or slurry, such as dairy cattle manure scraped from free-stall barns, is typically applied to cropland using tractor-drawn or truck-mounted tanks. This type of manure typically can be surface applied and may be subsequently incorporated into the soil by disking or plowing. Manure handled as a semi-solid may also be directly injected into the soil using specially designed spreading equipment. Manure handled as a liquid, such as flushed dairy and swine manure, and effluent from open cattle feedlots may be applied to cropland using tractor-drawn or truck-mounted tanks or irrigation systems. Due to the volume of manure when handled as a liquid, irrigation is a fairly common method for land application of liquid manure due to the reduction in labor requirements. Like semi-solid or slurry manure, liquid manure may be incorporated into the soil after application or may be directly injected into the soil.

Livestock and poultry manure has many beneficial properties in addition to the nitrogen and phosphorus needed by growing crops. As opposed to chemical fertilizers, manure improves soil quality and increases the soil's ability to absorb and retain moisture. Unfortunately, there are some areas in the country where the land available on farms for manure application is

insufficient to accept all of the manure produced. In the USDA report, *Manure Nutrients Relative to the Capacity of Cropland and Pastureland to Assimilate Nutrients*, Kellogg et al. (2000) used estimates of livestock populations and land available for manure applications from the Census of Agriculture. They found in some counties the production of recoverable manure nutrients exceeds the assimilative capacity of all the cropland and pastureland available for manure application (without excessive build-up of nutrients) in the county. The number of such counties has significantly increased since their initial analysis conducted in 1982. Figures 1-1 and 1-2 show the regions of the country with excess manure nitrogen and phosphorus assuming no export of manure from the farm, respectively (Kellogg et al., 2000).

A.6.0 Environmental Impacts

Livestock and poultry manure, if not properly handled and managed by the CAFO, can contribute pollutants to the environment and pose a risk to human and ecological health. The components of manure most commonly associated with animal waste include nutrients (including ammonia), organic matter, solids, pathogens, and odorous compounds. Animal waste can also be a source of salts and various trace elements (including metals), as well as pesticides, antibiotics, and hormones. These manure components can be released into the environment through spills or runoff if manure and wastewater are not properly handled and managed.

A CAFO's process wastewater and manure can enter the environment through a number of pathways. These include surface runoff and erosion, overflows from lagoons, spills and other dry-weather discharges, leaching into soil and ground water, and volatilization of compounds (e.g., ammonia) and subsequent redeposition on the landscape. Manure and wastewater can be released from an operation's animal confinement area, treatment and storage lagoons, and manure stockpiles, and from cropland where manure is land-applied.

EPA's *National Water Assessment Report* provides information on water quality conditions reported by states to EPA under Sections 305(b) and 303(d) of the Clean Water Act. Data submitted in 2010 indicates that the agricultural sector including crop production, pasture and range grazing, and CAFOs is the leading probable source contributing impairments to the nation's rivers and streams. The top causes of impairments in assessed rivers and streams are pathogens, sediment, nutrients, and organic enrichment/oxygen depletion – all of which are environmental impacts associated with over application or accidental spills of livestock manure, among other agricultural point source and non-point sources such as wildlife and rural septic tanks. The agricultural sector is also the fourth leading contributor of impairments for the nation's lakes, ponds, and reservoirs and the fifth leading contributor for probable water quality impairments in assessed coastal shorelines (EPA 2012b).

Among the reported environmental problems associated with excess nutrients are surface water (e.g., lakes, streams, rivers, and reservoirs) and ground water quality degradation, and adverse effects on estuarine water quality and resources in coastal areas. Scientific literature documents how this degradation might contribute to increased risk to aquatic and wildlife ecosystems; an example is the large number of fish kills in recent years. A literature survey conducted for the 2003 CAFO Rule identified more than 150 reports of discharges to surface waters from hog, poultry, dairy, and cattle operations. Human and livestock animal health

might also be affected by excessive nitrate levels in drinking water and exposure to waterborne human pathogens in manure (EPA 1998).

While most livestock producers understand the economic value of manure and many CAFOs follow individual nutrient management plans tailored to their farm conditions and the crops being grown, incidents can result from over application (too much), improper application (too close to surface waterways), unpredictable precipitation events, poor management, and accidental spills. Assistance for CAFOs in developing site-specific nutrient management plans is available through NRCS, private advisors and many state programs.

A.6.1 Nutrients

Animal wastes contain significant quantities of nutrients, particularly nitrogen and phosphorus. The nutrients provide a valuable resource that can save money by replacing chemical fertilizer. It is desirable to minimize nutrients lost from improper storage and land application. Manure nitrogen occurs in several forms, including ammonia and nitrate. Ammonia and nitrate have fertilizer value for crop growth, but these forms of nitrogen can also produce adverse environmental impacts when they are transported in excess quantities to the environment. Ammonia is of environmental concern because it is toxic to aquatic life and it exerts a direct biochemical oxygen demand (BOD) on the receiving water, thereby reducing dissolved oxygen levels and the ability of a water body to support aquatic life. Excessive amounts of ammonia can lead to eutrophication, or nutrient over-enrichment, of surface waters.

While nitrate is a valuable fertilizer because it is biologically available to plants, nitrate is mobile in soil and can leach to ground water. Excessive concentrations of nitrate in drinking water can produce adverse human health impacts such as methemoglobinemia in infants. Generally, people drawing water from domestic wells are at greater risk of nitrate poisoning than those drawing from public water sources, because domestic wells are typically shallower and not subject to wellhead protection monitoring or treatment requirements. Note that nitrate is not removed by conventional drinking water treatment processes but requires additional, relatively expensive treatment units.

Phosphorus is of concern in surface waters because it can lead to eutrophication and the resulting adverse impacts—fish kills, reduced biodiversity, objectionable tastes and odors, increased drinking water treatment costs, and growth of toxic organisms. Phosphorus is primarily sorbed to soil colloids and transportation to surface water occurs with soil erosion. Soluble phosphorus exists especially when soil is saturated with respect to P and has been found to leach in very sandy soils after many years of manure application. At concentrations greater than 1.0 milligrams per liter, phosphorus can interfere with the coagulation process in drinking water treatment plants thus reducing treatment efficiency. Phosphorus is of particular concern in fresh waters, where plant growth is typically limited by phosphorus levels. Under high pollutant loads, however, fresh water may become nitrogen-limited. Thus, both nitrogen and phosphorus loads can contribute to eutrophication.

A.6.2 Dissolved Oxygen

Livestock manures contain many carbon-based, biodegradable compounds. Once these compounds reach surface water, they are decomposed by aquatic bacteria and other microorganisms. During this process dissolved oxygen is consumed, which in turn reduces the amount of oxygen available for aquatic animals. Severe reductions in dissolved oxygen levels can lead to fish kills. Even moderate decreases in oxygen levels can adversely affect water bodies through decreases in biodiversity characterized by the loss of fish and other aquatic animal populations, and a dominance of species that can tolerate low levels of dissolved oxygen.

A.6.3 Solids

Solids from animal manure include the manure itself and any other elements that have been mixed with it. These elements can include spilled feed, bedding and litter materials, hair, and feathers. In general, the impacts of solids include increasing the turbidity of surface waters, physically hindering the functioning of aquatic plants and animals, and providing a protected environment for pathogens. Increased turbidity reduces penetration of light through the water column, thereby limiting the growth of desirable aquatic plants that serve as a critical habitat for fish, shellfish, and other aquatic organisms. Solids that settle out as bottom deposits can alter or destroy habitat for fish and benthic organisms. Solids also provide a medium for the accumulation, transport, and storage of other pollutants, including nutrients, pathogens, and trace elements.

A.6.4 Pathogens

Pathogens are defined as disease-causing microorganisms. A subset of microorganisms, including species of bacteria, viruses, and parasites, can cause sickness and disease in humans and are known as human pathogens. EPA's *National Water Assessment Report* indicates that pathogens are the leading stressor in impaired rivers and streams and the second leading stressor in impaired estuaries, coastal shorelines, and wetlands (EPA 2012b). Livestock manure may contain a variety of microorganism species, some of which are human pathogens. Multiple species of pathogens can be transmitted directly from a host animal's manure to surface water. Pathogens already in surface water can increase in number because of loadings of animal manure nutrients and organic matter.

A number of pathogens are associated with livestock and poultry manure but only a few pose a known or potential threat to humans. The six human pathogens that account for more than 90 percent of food and waterborne diseases in humans are found in livestock manure. These organisms are: *Campylobacter* spp., *Salmonella* spp. (non-typhoid), *Listeria monocytogenes*, *Escherichia coli* O157:H7, *Cryptosporidium parvum*, and *Giardia lamblia*. All of these organisms may be readily transmitted from one animal to another in CAFO settings. Pathogens from animal wastes can enter water sources, resulting in contamination of surface waters. In addition to threats to human health through drinking water exposures, pathogens from animal manure can also threaten human health through shellfish consumption and recreational contact such as swimming in contaminated waters. An important feature relating to the potential transmission for disease for each of these organisms is the relatively low infectious

dose in humans. The protozoan species *Cryptosporidium parvum* and *Giardia lamblia* are frequently found in animal manure and can cause infection in humans. Bacteria such as *Escherichia coli* O157:H7 and *Salmonella* spp. are also often found in livestock manure and have been associated with waterborne disease. The bacteria *Listeria monocytogenes* is ubiquitous in nature and is commonly found in the intestines of wild and domestic animals.

A.6.5 Salts

The salinity of animal manure is directly related to the presence of dissolved mineral salts. In particular, significant concentrations of soluble salts containing sodium and potassium remain from undigested feed that passes unabsorbed through animals. Other major constituents contributing to manure salinity are calcium, magnesium, chloride, sulfate, bicarbonate, carbonate, and nitrate. Especially in arid soils salt buildup deteriorates soil structure, reduces permeability, contaminates ground water, and reduces crop yields. In fresh waters, **increasing** salinity can disrupt the balance of the ecosystem, making it difficult for resident species to remain. Salts also contribute to degradation of drinking water supplies, primarily from runoff containing manure.

A.6.6 Trace Elements

EPA's *National Water Assessment Report* indicates that metals (other than mercury) are the fourth leading stressor in impaired wetlands and the fifth leading stressor in impaired lakes (EPA 2012b). Trace elements of environmental concern in manure include arsenic, copper, selenium, zinc, cadmium, molybdenum, nickel, lead, iron, manganese, aluminum, and boron. Of these, arsenic, copper, selenium, and zinc are often added to animal feed as growth stimulants or biocides. Trace elements can also end up in manure through use of pesticides used to suppress houseflies and other pests. Trace elements have been found in manure lagoons and drainage ditches, agricultural drainage wells, and tile line inlets and outlets. They have also been found in rivers adjacent to hog and cattle operations. Trace elements in agronomically applied manures are generally expected to pose little risk to human health and the environment. Most crops, for example, beneficially use a small amount of copper and zinc to complete their life cycle but any amount not assimilated through plant uptake can accumulate in the soil (Novak et al., 2004). Repeated manure application in excess of agronomic rates could result in cumulative metal loadings to levels that potentially affect human health and the environment.

A.6.7 Antibiotics

Antibiotics are used in AFOs for the prevention, treatment and control of animal diseases and can be expected to appear in animal wastes. Antibiotics are used both to treat illness and as feed additives to promote growth or to improve feed conversion efficiency. Between 60 and 80 percent of all livestock and poultry receive antibiotics during their productive lifespan. The primary mechanisms of elimination are in urine and bile, so essentially all of an antibiotic administered is eventually excreted, whether unchanged or in metabolite form. The use of the same antibiotics for humans and livestock has been noted by the World Health Organization (WHO) and others who are concerned that the effectiveness of these antibiotics in treating human diseases could decrease. The emergence of resistant bacteria is of particular concern

because such infections are more difficult to treat and require drugs that are often less readily available, more expensive, and more toxic. The Food and Drug Administration issued a guidance in 2012 encouraging the judicious use of antimicrobial drugs in food animals. They are continuing to work with the pharmaceutical industry to phase out the use in livestock and poultry of medically important antibiotics for human health.

A.6.8 Pesticides and Hormones in CAFOs

Hormones and pesticides are chemicals commonly found in CAFO manure, and both have been linked with endocrine disruption of fish and invertebrates in the surrounding environments. Several forms of estrogens, androgens, or a combination of both have been detected in dairy waste (Zheng et al. 2008), and poultry litter (Jenkins et al. 2006). Pesticides, especially those that are used for treatment of parasites, have also been detected in the environment following manure application (Floate et al. 2005).

Hormones are naturally occurring chemicals produced by animals to regulate physiological processes such as metabolism, growth, and reproduction. Natural steroid hormones include estrogen, progesterone, and testosterone. Synthetic steroid hormones, which mimic the actions of the naturally occurring compounds, may be administered to livestock to promote better muscle growth, produce leaner meat, improve feed conversion efficiency, and improve breeding. Other types of hormones (non-steroid hormones or protein hormones) may also be given to promote growth and increase milk production. Hormones categorized as progestins and gonadotropins may be administered via injections or other means to improve breeding efficiency. A complete list of FDA approved steroid hormones used as implants and their specific use for growth promotion can be found in the Code of Federal Regulations (CFR), Title 21, Parts 522 and 556.

Feedlot effluents containing hormones have been shown to affect fish in adjacent streams causing decreased synthesis of testosterone, smaller testis size, and general demasculinization of those fish (Orlando et al. 2004). Other effects of hormones in the aquatic environment may include feminization or intersex condition in fish and increases in concentrations of proteins related to egg laying in both male and female fish.

Varieties of pesticides are approved for use in feedlot animals for control of insects and parasites, and can enter process wastewater via runoff from topical applications or from manure. These compounds are administered via injection, insecticidal ear tags, or oral consumption in feed/minerals. They may also be applied directly to the skin as pour-on formulation or when animals (especially cattle) pass under a backrubber/oiler or dust bag where insecticides are dispensed to the skin. Ivermectin is a common pesticide that can be applied by several methods to livestock for control of roundworms, lung worms, cattle grubs, mites, lice, and horn flies. Some pesticides are used in CAFOs specifically to control flies. For example, the insecticide methoprene is sometimes used as a feed or mineral additive to control horn flies. Methoprene passes through the digestive tract of animals and remains in the manure where horn flies lay eggs. The pesticide mimics an insect growth regulator called juvenile hormone, and disrupts the life cycle and development of the larval flies.

Insecticides are often designed to interfere with hormonal processes like molting, growth, or reproduction in invertebrates. Residues of some insecticides are well documented for adversely affecting other non-target populations of insects. Additionally, effluent from CAFOs or runoff resulting from spreading manure on pastures or cropland introduces pesticides into the soil and aquatic environment where aquatic insects may be affected. Parasiticides like ivermectin and some insecticides are known to cause mortality to aquatic insects (Schweitzer et al. 2010).

Careful use of hormones, pesticides, insecticides, and antibiotics for production agriculture is important to protect the animals, the livestock producers, the public and the environment. Because these substances are often present in manure, careful management and land application of manure and process wastewater is equally important.

Appendix AE – Management/Soil Science

NUTRIENT MANAGEMENT AND SOIL SCIENCE

Understanding soil science and soil fertility concepts are instrumental in developing, understanding, and implementing nutrient management plans (NMPs) that allow for maximum utilization of the nutrients in the soil while minimizing the runoff of nutrients and pollutants. CAFO inspectors should become aware of the following basic nutrient management and soil science concepts.

Soil Properties

Inspectors should understand the basics of soil properties and how the soil retains nutrients. The nutrients in the soil are a source of information for NMP development and implementation. Important soil priorities are:

- Organic matter is derived from decomposed plant and animal material.
- Bulk density is the mass of dry soil per unit of bulk volume, including the airspace. Soils with a high proportion of pore space to solids have lower bulk densities than those that are more compact and have less pore space. As bulk density increases, pore space is reduced, which inhibits root growth. Fine-textured soils such as silt loams, clays, and clay loams generally have lower bulk densities than sandy soils. Sandy soils typically have less total pore space than finer textured soils.
- Texture is the fineness or coarseness of the mineral particles in the soil and is determined by the relative amounts of different sized mineral particles in the soil.
- Aggregation is the cementing or binding together of several soil particles into a secondary unit.
- Structure describes how soil particles are arranged or grouped together to form structural pieces (building blocks) called peds or aggregates that vary in shape and size. The arrangement of the aggregates determines the soil's structure. Good structure allows favorable movement of air and water and allows and encourages extensive root development.
- Color is an indicator of the soil's composition. Soil colors usually result from various oxidation states of the present minerals. Brighter colors (yellow and red) are an indication of iron oxides and suggest good drainage and aeration. Grayish soils can indicate iron reduction caused by permanently saturated soil. Mottled color soils of various shades of yellow, brown, and gray are indicative of a fluctuating aerobic and anaerobic environment. Very dark browns and black soil colors can be an indication of high levels of organic matter.
- Retention/water-holding capacity is the amount of water retained in a soil that is dependent on the interaction of soil texture, bulk density, and aggregation. The term field capacity defines the amount of water remaining in a soil after downward gravitational flow has stopped, and it is expressed as a percent by weight.
- Soil drainage is defined as the rate and extent of water removal. This includes water movement across the surface and downward through the soil. Topography is a very

important factor in soil drainage. Other factors that affect drainage include the soil layers' texture and soil structure.

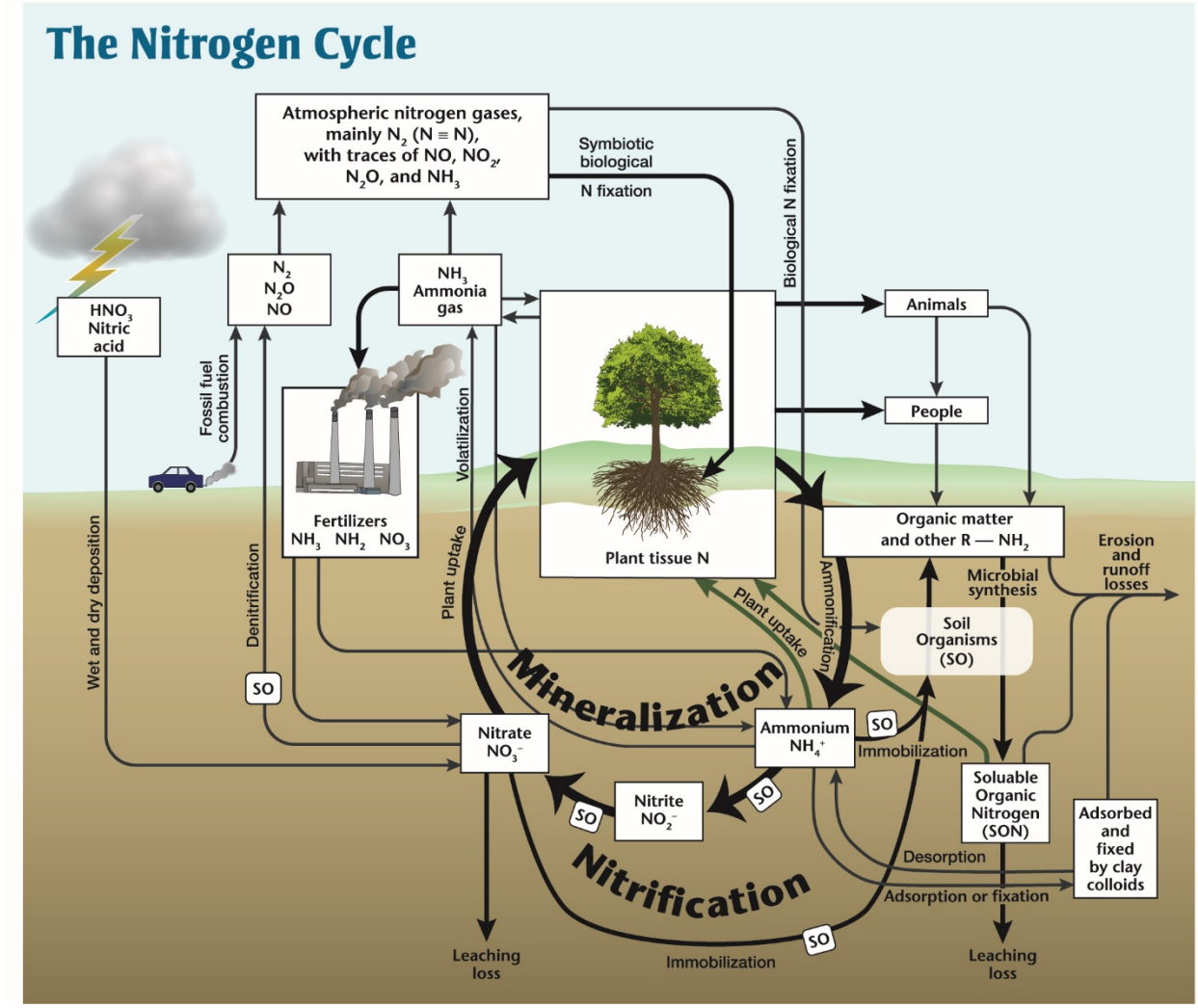
- Cat-ion Exchange Capacity (CEC) is a measure of the soil's ability to retain cat-ions and is indicative of the soil's fertility. Soil materials have a net surface charge, usually negative, that allows them to hold and retain ions (i.e., nutrients) against leaching. The net negative charge of a soil is largely attributed to the clay and organic matter in the soil and will naturally attract positively charged nutrients and repel negatively charged nutrients. Cat-ions, positively charged nutrients (e.g., ammonium (NH3+)), remain in the soil while anions, negatively charged nutrients (e.g., nitrate (NO3-)), are repelled and easily leached out of the soil.
- Soil Fertility is the ability of a soil to provide nutrients for plant growth.
- Soil pH affects plant nutrient availability because pH greatly influences the solubility of certain elements. Most crops grow best in slightly acidic soils (pH 6.0 to 6.5).

Soil and Plant Availability of Nutrients

Soil is a pathway for nutrients to flow to surface and groundwater and soil is a medium for nutrient transformations. The nutrient transformations affect the amount and form of nitrogen and phosphorus available to the plant. Appropriate manure and fertilizer applications in an NMP will account for many of the transformations. It is important for an inspector to understand the behavior of nitrogen and phosphorus in the soil.

Nitrogen Cycle and Nitrogen Movement in the Soil

Nitrogen is an essential part of amino acids, the building blocks for proteins, making it an important plant nutrient. Nitrogen in the soil exists in both organic (proteins, amino acids, urea, in living organisms and decaying plant and animal tissues) and inorganic forms [ammonium (NH4+), nitrite (NO2-), nitrate (NO3-), and ammonia (NH3 (gas)). The majority of nitrogen in the soils is in an organic form which is largely unavailable for plant uptake.



When manure is land applied as an organic compound, only a small fraction of the nitrogen is soluble as ammonium and plant available. However, a larger portion of that nitrogen is mineralized by microbes and is slowly released over many years. Nitrogen mineralization rates of the organic nitrogen present in manure vary depending on various environmental factors such as soil type, the manure source, and climate.

Nitrate is a negatively charged ion that is not adsorbed to the negatively charged soil mineral surfaces. If in excess, the negatively charged nutrient is repelled by the soil surfaces and lost to groundwater through leaching. Factors that contribute to nitrogen leaching or runoff include over-application of nitrogen as fertilizers or manure particularly on sandy or coarse-textured soils; improperly timed applications of nitrogen, poorly designed or nonexistent soil conservation measures; and periods of exceptionally heavy rainfall.

Nitrogen and Legume Credits

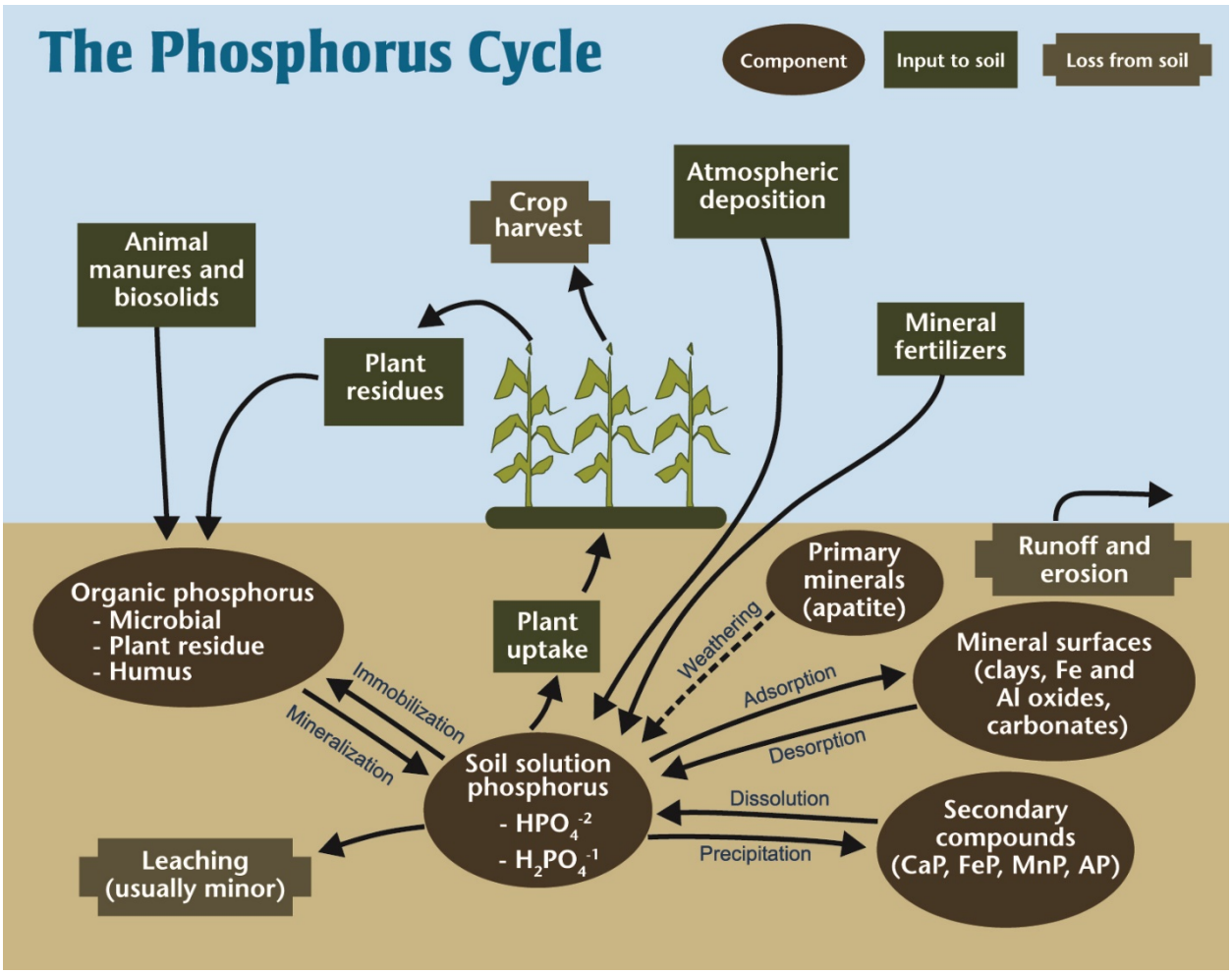
The largest amount of nitrogen is found in the atmosphere as an inert gas (N_2). Plants are not able to absorb gaseous nitrogen. Nitrogen becomes plant available when specialized bacteria fix nitrogen gas. Leguminous plants, such as alfalfa and soybeans, have a symbiotic relationship

with nitrogen-fixing bacteria, where the bacteria supply sufficient nitrogen to the plant and the plant supplies carbohydrates to the bacteria. Because of that relationship, a legume crop is able to supply its own nitrogen need and enrich the soil with nitrogen for crops that follow in the rotation and therefore is considered a nitrogen credit.

Since most of the nitrogen in soils is unavailable to plants, manure is typically applied to crops to provide the important nutrients that the plant needs. However, if legume crops are planned in a rotation, legume crops supply nitrogen rather than using nitrogen from the soil. Once the nitrogen recommendation for a crop is known, the manure application rates can be determined by subtracting from the total nitrogen recommendation the amount that will be available to the crop from all other sources. These sources of nitrogen already in the field are referred to a nitrogen credits. Two common credits of plant available nitrogen (PAN) are organic nitrogen from prior manure applications that mineralizes to available nitrogen compounds over the course of the planning period and nitrogen supplied from legume crops.

Phosphorus Cycle and Phosphorus Movement in the Soil

Sources of soil phosphorus include decomposing organic matter, humus, and weathered rock. Plant available forms of phosphorus include hydrogen phosphate (HPO_4^{-2}) and dihydrogen phosphate ($H_2PO_4^-$). Unlike nitrogen, gaseous forms of phosphorus seldom exist and are often not considered in the phosphorus cycle.



When phosphate ions are added to a soil, they are quickly (within hours) removed from solution to form phosphorus containing compounds with very low solubility. Phosphate most commonly forms compounds with either calcium or iron and aluminum (sometimes manganese). Initially, some ions are retained on the exchange complex, which makes them moderately plant available but with time, they undergo sequential reactions that continually decrease their solubility. These reactions result in phosphorus permanently bonding to the calcium or aluminum/iron/manganese ions, becoming buried from additional precipitation reactions. Those reactions can also capture phosphorus within the calcium or iron/aluminum/manganese particles. That is called phosphorus fixation and it is not easily reversible.

Additions of fertilizers and manures typically allow for only 10 to 15 percent of added phosphorus to be taken up by plants because of that fixation capacity. During the early and mid ‑20th century, farmers applied phosphorus in quantities far in excess of the plants' nutritional needs and manure has historically been applied at rates to meet plant nitrogen requirements, which can supply 2 to 4 times the phosphorus requirement. What was not removed in the harvest accumulates in the soil in an insoluble, unavailable form.

If not taken up by plants, phosphorus can be lost with surface runoff as dissolved phosphorus (if not incorporated into a soil) or it can be lost with soil particles through erosion or leaching.

Infiltration, Percolation, Leaching, Runoff and Erosion and its Effects on Water Quality

A primary principle of soil water management is to encourage water movement into, rather than off the soil. The more water runs off the surface, the less infiltrates into the soil. The movement of water impacts the movement of nitrogen and phosphorus in the soil. As water enters a soil (infiltration) and moves down through the soil profile (percolation) it carries dissolved nutrients with it (leaching). Dissolved nutrients can also be carried through runoff over the soil. Leaching losses occur when the amount of rainfall or irrigation water entering a soil exceeds the soil's ability to store the excess rainfall or irrigation. The amount and rate of nutrient losses are influenced by the amount of rainfall or irrigation, the topography of the landscape, the amount of evaporation, the soil type, and the crop cover.

The goal for the application of nutrients is to make them available to crops. As described above, as nitrogen (nitrate) percolates through the soil, it can contaminate ground and surface waters. Nitrate can be toxic because it reduces the capacity for blood to carry oxygen. That can be lethal to human infants and can alter normal body functioning in adults. Surface runoff waters from heavily fertilized lands can contain levels of nitrate toxic to livestock. While phosphorus is not toxic, it can degrade water quality if lost from a soil system in significant quantities. Excessive growth of algae and other aquatic species takes place in water overly enriched with nitrogen and phosphorus. This eutrophication process depletes the water of its oxygen, thus harming aquatic life in the affected waterbody.

Maintaining good soil structure is critical to reducing runoff. Excess water that cannot infiltrate the soil accumulates on the surface and flows downgrade displacing surface soil particles along the way (erosion). Soil erosion damages productive soils and can increase nutrient transport to streams and lakes. Soil properties have an effect on nutrient leaching losses. The physical properties of sand, silt, and clay, and the relative proportions of each have direct bearing on nutrient retention. Coarse soils (soils with a high percentage of sand) generally permit greater nutrient loss than do finer textured soils (soils with higher percentage of silt and clay). Organic matter content and type and amount of clay have significant influence on retention and nutrient storage and exchange. Climatic factors and the amount of rain or irrigation water, along with best management practices, have an effect on the amount of infiltration and leaching that occurs in the soil.

Many best management practices are available to encourage residue management and to minimize negative consequences of soil tillage. Excessive tillage destroys the surface and should be avoided. Tillage across the slope, leaving small ridges, encourages water infiltration. Terraces can also help control the erosive potential of water movement and increase infiltration into the soil.

For a more detailed discussion of these concepts, see Appendix A. "Basic Soil Science and Soil Fertility" of the *CAFO Permit Writer's Manual*.

Appendix AF –
Standard Operating Procedure (SOP): Biosecurity Procedures for Visits to Livestock and Poultry Facilities

OFFICE OF ENFORCEMENT AND COMPLIANCE ASSURANCE STANDARD OPERATING PROCEDURE (SOP)

Biosecurity Procedures for Visits to Livestock and Poultry Facilities

General

SUMMARY OF PROCEDURE/PURPOSE

This procedure minimizes the risk of EPA personnel and those acting on their behalf (e.g., contractors, grantees, and senior environmental employment staff), here after called "EPA personnel," transmitting animal diseases from livestock or poultry facilities, to livestock or poultry at another location. Livestock and poultry facilities include ranches, farms, dairies, feed yards, sale yards, swine premises, slaughterhouses, zoos, veterinarians, laboratories and other facilities where there are animals or unprocessed animal tissues, secretions or excretions, here after called "livestock and poultry facilities".

SCOPE AND APPLICABILITY

These procedures apply to EPA personnel whose job responsibilities require them to make visits to livestock or poultry facilities. These visits may be conducted as part of an inspection, to conduct environmental monitoring, as part of a response action or for other purposes.

OECA has developed this SOP for EPA employees and it is intended solely for internal management purposes. It does not create any rights, substantive or procedural, enforceable at law. OECA may periodically revise this SOP to make improvements and/or to reflect changes in EPA policy. OECA reserves the right to act at variance with this procedure.

If, on a case by case basis, an EPA employee believes a variance is needed from a provision of this SOP, the situation should be discussed with the appropriate safety officer who can provide site- specific guidance. Any such variance must be explained and documented. Varying from this procedure does not disqualify information obtained for any purpose.

DEFINITIONS

Definitions for certain terms included in this SOP are provided in OECA's Standard Operating Procedure Definitions document available on the OECA Document Control SharePoint site.

EXTENSIVE ANIMAL CONTACT

- Extensive animal contact activities involve prolonged, direct contact with livestock or poultry or unprocessed animal tissues, secretions or excretions.

FOREIGN ANIMAL DISEASES

- Foreign animal diseases in the U.S. include highly pathogenic avian influenza, exotic Newcastle Disease, foot-and-mouth disease, classical swine fever, and African swine fever.

FIELD ACTIVITIES

- See OECA's Standard Operating Procedure Definitions document.

HIGH RISK LOCATIONS

- High risk locations are those with existing emergency animal disease events.

LIVESTOCK AND POULTRY FACILITIES

- Include ranches, farms, dairies, feed yards, sale yards, swine premises, slaughterhouses, zoos, veterinarians, laboratories, and other facilities where there are animals or unprocessed animal tissues, secretions or excretions.

LEVEL 1 VISIT

- Visit to a farm/ranch that entails only an office or home visit that is not in a high risk location, and where no extensive contact is anticipated.

LEVEL 2 VISIT

- Visit to a farm/ranch where EPA personnel expect to walk around buildings, but not enter any confinement areas and expect to have minimal contact with livestock or poultry. The visit is not in a high risk location, and no extensive contact is anticipated.

LEVEL 3 VISIT

- Visit to a farm/ranch where there will be close contact, or a reasonable expectation of close contact, with livestock or poultry (walking through narrowly confined pens/lots where animals are within reach). The visit is not in a high risk location, and no extensive contact is anticipated.

PERSONNEL QUALIFICATIONS/RESPONSIBILITIES FOR HEALTH AND SAFETY

EPA personnel must comply with all applicable basic health and safety training requirements under Order 1440.2 *Health and Safety Requirements for Employees Engaged in Field Activities.* Supervisors must ensure that these requirements are met. EPA personnel should monitor for any revised or additional health and safety orders, policies and guidance that may affect them. Prior to the inspection/field investigation, a Health and Safety Plan (HASP) must be prepared to determine any health and safety hazards associated with the visit, and placed in the project file. Additionally, a Job Hazard Analysis (JHA) must be prepared for each field personnel's position.

If the EPA personnel's field activities include compliance monitoring or field investigations, the individuals must ensure they have completed all relevant inspector training as required under EPA Orders 3500.1 and 3510.

REFERENCES/OTHER ASSOCIATED PROCEDURES

- USDA/NRCS General Manual, Title 130, Part 403, Subpart H.
- EPA Order 1440.2, Health and Safety Requirements for Employees Engaged in Field Activities
- SHEM Guideline 51, Mandatory Health and Safety Training

- EPA Order 3500.1 Training Requirements for EPA Personnel Who Are Authorized to Conduct Civil Compliance Inspections/Field Investigations and EPA Inspector Supervisors, September 30, 2014
- EPA Order 3510 Training Requirements for Federal Credentials for Inspections and Enforcement of Federal Environmental Statutes and other Compliance Responsibilities, updated October 31, 2012
- *Livestock and Poultry Operation Inspections Under EPA's National Pollutant Discharge Elimination System Program*, fact sheet, Sept. 2014, EPA 305-F-14-001
- SHEM Guideline 29, Permit Required Confined Space

PROCEDURE

EQUIPMENT REQUIREMENTS

EPA personnel should be aware of personal health and safety issues when visiting livestock and poultry facilities and consult Health and Safety staff with questions about proper procedures and equipment needed. Livestock and poultry facilities may include areas defined by Occupational Safety and Health Administration (OSHA) as "confined spaces" (e.g., manure pits, grain silos, manure digesters, holding tanks/vaults/sumps/hoppers), which may have a potentially hazardous atmosphere and impair the ability to self-rescue. EPA personnel should not enter such areas.[26] In addition, extreme cold or hot conditions may necessitate adaptation of these procedures; personnel may want to consult with Health and Safety staff regarding any needed modifications to this SOP.

The following clothing and supplies should be considered for visits to livestock and poultry facilities.

CLOTHING/PERSONAL PROTECTIVE EQUIPMENT

- Plastic coveralls (disposable outerwear) or cloth coveralls
- Standard steel-toed safety boots with disposable boot covers
- Disposable gloves (e.g., nitrile, or vinyl)
- Hair nets
- Filtering face piece (respiratory protection beyond this is not anticipated but if necessary, would require additional supplies and procedures)
- Safety glasses with impact protection
- Hardhats

[26] If EPA personnel need to enter permit required confined spaces, OSHA requires that your employer develop written procedures, an entry permit system, and training for confined space entry. All appropriate safety precautions, which may include the use of appropriate air monitoring devices and personal protective equipment (PPE), must be followed. Refer to SHEM Guideline 29, Permit-Required Confined Space (internal EPA link)

SUPPLIES (SUPPLIES MUST BE APPROPRIATE TO PLANNED ACTIVITIES, SEE SECTION 2.3 FOR DECONTAMINATION PROCEDURES)

- Water container(s) for potable water
- EPA-approved disinfectant and relevant safety data sheets (SDS)
- Spray bottle for disinfecting small items
- Pump sprayer for disinfecting large items
- Long-handled brush
- Trash bags and zip-lock bags
- Paper towels
- EPA-approved soap or antibacterial wipes or products
- Bucket
- Duct tape to secure plastic boot covers, coveralls, etc.
- Waste containers for storing disinfectant rinsate, other liquid waste
- Plastic tub for storing "dirty" equipment and PPE in the vehicle
- Insect repellant
- First aid kit, including tick removal tool

FACILITY-PROVIDED TRANSPORTATION

EPA personnel may accept offers of facility-provided transportation within a facility if the total value of the transportation is $20 or less. Consult with your ethics counselor if any of the following conditions apply:

- The total value of the transportation exceeds $20, or
- You will be transported in non-ground vehicle (e.g., aircraft or helicopter) or
- You will likely be transported across more than one facility.

With prior approval, the Office of General Counsel may be able to accept the gift of travel pursuant to 31 USC 1353 through use of the ethics travel form. To use the ethics travel form, you must: be on travel status (more than 50 miles from the duty station); have a facility representative accompany you; *and* be on travel **in connection with a meeting or educational tour** (**not** an inspection).

DECONTAMINATION PROCEDURES

The following procedures should be used to clean equipment, PPE, vehicle tires, and other items that become contaminated.

- Select an EPA registered disinfectant that will be active across a wide spectrum of germs under the conditions in which it will usually be used.
- The state veterinarian, APHIS or the state agriculture department may be able to assist EPA personnel with selecting an appropriate disinfectant.

- When on-site, consult the owner or operator to select a location for later decontamination. Where possible, use an existing decontamination area on-site.
- If there is no designated decontamination area already on-site, select an area on-site, but in an area that will minimize recontamination when leaving the site. The area should allow for proper management of the rinsate (e.g., rinsate will not runoff the property).
- Place clean clothing to change into, as appropriate, in a closed bag at the decontamination site.
- Place all needed decontamination supplies including sufficient water or access to running water at the decontamination site.
- Mix the disinfectant (if not ready-to-use) according to label directions and use appropriate PPE e.g., gloves, eye protection.
- Brush or rinse the contaminated item to remove all visible manure and other debris.
- Apply disinfectant to the item or place item in a container of disinfectant, according to label directions being careful to allow the disinfectant to remain in contact with the item for the required length of time if listed on the label.
- Rinse with water if and as directed on the disinfectant label.
- Place the decontaminated item in a clean location or in a clean bag or another container.
- Manage or contain rinsate if needed, and as appropriate.
- Dispose of used disinfectant according to label directions.

PROCEDURES FOR VISITING LIVESTOCK AND POULTRY FACILITIES

When planning visits to livestock and poultry facilities, EPA personnel should contact APHIS and/or the state veterinarian to identify any high risk areas with existing emergency animal disease events where travel should be avoided. Whenever EPA personnel are directed by the state veterinarian or APHIS not to enter an area, EPA personnel should refer to section 2.4.2 Procedures for Visits to High Risk Locations and Visits with Extensive Animal Contact. In addition, this information should be provided to the OECA Office of Compliance's Concentrated Animal Feeding Operation (CAFO) Coordinator and/or entered in the OECA Biosecurity SharePoint site.

PROCEDURES AFTER CONTACT WITH ANIMALS IN FOREIGN COUNTRIES

If EPA personnel have visited a foreign country where they were exposed to or had contact with animals (with or without a known contagious disease) they should inform their supervisor and should not make on-site visits to livestock or poultry facilities for at least 5 calendar days after their return. Clothing and equipment (including shoes) worn or used when exposed to or contacting animals must be cleaned (i.e., laundered, or rinsed to remove debris and washed with disinfectant according to label directions) before they are used at U.S. facilities. If cleaning is not possible, alternative clothing or equipment should be used.

PROCEDURES FOR VISITS TO HIGH RISK LOCATIONS AND VISITS WITH EXTENSIVE ANIMAL CONTACT

Whenever EPA personnel are directed by the state veterinarian or APHIS not to enter an area, EPA personnel should provide this information to the OECA Office of Compliance's Concentrated Animal Feeding Operation (CAFO) Coordinator and/or enter it in the OECA Biosecurity SharePoint site and follow the procedures in this section.

As a general rule, EPA will **not** conduct inspections on livestock or poultry facilities in areas with ongoing emergency foreign animal disease response activities (e.g., vaccination program, depopulation, disposal, or virus elimination). EPA will consult with the state veterinarian or APHIS office to determine when quarantines have ended and it is safe to resume inspections in the area. In special situations where there is information that demonstrates a substantial risk to

human health or the environment, for example, as a result of a discharge from a poultry or livestock operation, EPA should consult with the state veterinarian or APHIS office to identify when it is safe to visit individual operations. Information on these types of situations also should be provided to the OECA Office of Compliance's CAFO Coordinator and/or entered in the OECA Biosecurity SharePoint site.

If EPA personnel anticipate they will have extensive contact with animals or unprocessed animal tissues, secretions or excretions during a visit to a livestock or poultry facility, they should consult with the state veterinarian or APHIS office and their health and safety staff to identify appropriate biosecurity procedures.

PROCEDURES FOR VISITS AT NON-HIGH RISK LOCATIONS, AND NO EXTENSIVE CONTACT

The procedures below provide basic biosecurity practices EPA personnel should follow when visiting farms, ranches, slaughterhouses and other facilities with **no known livestock or poultry diseases and where extensive contact is not planned**.

The biosecurity practices below are based on U.S. Department of Agriculture APHIS and Natural Resources Conservation Service[27]2 (NRCS) procedures. Facility operators may have adopted more stringent biosecurity measures (e.g., showering and changing clothes to come on to or leave the premises).

EPA PERSONNEL SHOULD DISCUSS APPROPRIATE BIOSECURITY MEASURES WITH THE OWNER/OPERATOR AND ARE ENCOURAGED TO ADOPT MORE STRINGENT MEASURES, AS APPROPRIATE, INTO THE PROCEDURES FOR THAT SPECIFIC FACILITY.

PRIOR TO THE VISIT

- Avoid wearing or using any apparel or equipment that cannot be easily cleaned and disinfected. Consider bringing bags to keep sensitive equipment such as phones, and cameras clean.

[27] NRCS General Manual, Title 130, Part 403, Subpart H.

- When visiting a facility with various age groups of one species in one day, visit the youngest animal group first. Poultry is an exception. Poultry breeding stock should be visited before other commercial birds.
- Designate a part of the vehicle to carry "dirty" items, preferably separate from the "clean" part of the vehicle where clean supplies are placed, e.g. the dirty area could be inside the trunk of a car.
- In consultation with Health and Safety staff, identify an appropriate location such as an EPA or state laboratory, or office, for disposal of soiled disposable items in case the owner/operator will not allow the waste to remain on-site.
- While it is highly unlikely that any medical or hazardous wastes would be created, if you suspect they may be created due to the type of facility or type of inspection (e.g., involving sampling of wastes), EPA personnel should consult with the appropriate EPA staff to determine the best handling and disposal methods.

BEGINNING THE VISIT

- Close vehicle windows.
- Park vehicle on paved or gravel areas away from pens, pastures, or areas where animals may be held to avoid contact with dirt, urine, blood, litter, wastewater or manure.
- Wash hands with soap and potable water or use antibacterial wipes or gel before entering the site.
- The facility staff may request that the EPA personnel's vehicle tires be disinfected prior to entering the facility.
- On entering a facility, inform a responsible facility representative of any and all other livestock and poultry facilities visited within the previous 48 hours and whether you entered any animal confinement or waste storage areas.
- Discuss appropriate biosecurity measures with the owner/operator. Facility operators may have adopted more stringent biosecurity measures (e.g., showering and changing clothes to come on to or leave the premises). **EPA personnel are encouraged to adopt more stringent measures, as appropriate, into the procedures for that specific facility.**
- Do not enter pens or buildings where animals are housed or confined.
- EPA personnel should only enter animal confinement areas if it is essential to complete the goals of the visit, and should be accompanied by or authorized to do so by the facility operator.
- Avoid contact to the extent possible with livestock, poultry or other animals (wild or domestic) on any facility.

EPA personnel should follow the appropriate level of biosecurity procedures outlined below depending on the type and circumstances of the planned visit.

ACTIVITIES APPROPRIATE BY RISK LEVEL

Level 1 Visits: Visits to Farms/Ranches That Entail Only Office or Home Visits

In addition to the requirements for visits described in sections 2.4.3.1 and 2.4.3.2, for Level 1 visits:

- Wear clean, steel-toed shoes or boots that can be rinsed and washed with disinfectant (e.g., avoid wearing suede).
- After the visit, inspect shoes prior to entering the vehicle. Clean shoes or boots if they became contaminated with urine, blood, wastewater, or manure, according to decontamination procedures.

After the visit, follow the procedures in sections 2.5 and 2.6 as appropriate.

Level 2 Visits: Visits To Farms/Ranches With Minimal Contact With Livestock

In addition to the requirements for visits under sections 2.4.3.1 and 2.4.3.2, for Level 2 visits:

- Upon arrival and exiting the vehicle, put on new plastic or disinfected rubber boots or other footwear that has been cleaned and disinfected or wear new disposable boot covers. The operator may supply boots, boot covers, or other PPE for you to wear.
- EPA personnel are encouraged to wear disposable coveralls to prevent contamination of clothing. This decision should be made on a case-by-case basis.

After the visit, follow procedures in sections 2.5 and 2.6 as appropriate.

Level 3 Visits: Visits To Facilities With Close Contact

In addition to the requirements for visits under sections 2.4.3.1 and 2.4.3.2, for Level 3 visits:

- Upon arrival and exiting the vehicle, put on new plastic or disinfected rubber boots or other footwear that has been cleaned and disinfected or wear new disposable boot covers. The operator may supply boots, boot covers, or other PPE for you to wear.
- Put on a pair of new disposable or clean coveralls for each visit if personnel will have, or there is a reasonable expectation of, close contact with livestock/poultry (walking through narrowly confined pens/lots where animals are within reach).
- When entering areas where animals will be within reach, personnel should consider wearing disposable gloves and hair nets.
- After visiting areas in which animals are in close proximity, EPA personnel may remove disposable items and resume the inspection in apparel appropriate for the remainder of the visit.

After the visit, follow procedures in sections 2.5 and 2.6 as appropriate.

PROCEDURES AT THE COMPLETION OF THE VISIT

- If not discussed earlier, at the end of the visit, inform the operator of the areas of the site that were visited, and the biosecurity procedures followed.
- Non-disposable items
- At the end of the visit, remove any non-disposable boots/coveralls and, where appropriate, clean and disinfect on-site using decontamination procedures (2.4).
- If non-disposable items are not cleaned and disinfected on-site, place them in the "dirty" area of the vehicle in a manner that minimizes contamination of the vehicle to be cleaned and disinfected later. For example, place "dirty" items together in a covered plastic tub.
- Disposable items
- Place all soiled disposable items in plastic garbage bags and close securely.
- If the outside of the garbage bag became contaminated, wash it off and decontaminate the outside of the bag according to decontamination procedures (2.4).
- If acceptable to the owner/operator, leave the plastic bag with soiled disposable items on-site for disposal.
- If it is not possible to leave the bag on-site, ensure the bag is closed securely, double bag it, and place it in the "dirty" area of the vehicle.
- If the vehicle or tires became contaminated with dirt, urine, blood, wastewater, or manure, wash and disinfect vehicle tires and wheel wells at a location on-site designated by the owner/operator if possible.
- If it is not possible to wash and disinfect the vehicle or tires completely on-site, take the vehicle to a car wash before taking the vehicle to another facility. Record when and where the car was washed in the vehicle logbook.
- Wash your hands with soap and potable water or use antibacterial wipes or gel before leaving the site.

PROCEDURES FOR THE END OF THE DAY

EPA personnel should follow the procedures below after all visits to livestock or poultry facilities have been completed for the day.

- If it was not possible to leave used, disposable items at the facility where they were used, return the double bagged garbage bag to the pre-selected location for disposal (i.e., EPA or state agency facility) or other location identified through consultation with appropriate Health and Safety staff.
- While it is highly unlikely that any medical or hazardous wastes would be created, if these types of wastes were created, EPA personnel should follow prearranged procedures for handling, storage and disposal (see section 2.4.3.1).
- Clean/launder all reusable clothing in hot water with a disinfectant soap.

- Clean and disinfect equipment according to decontamination procedures.
- Take a shower.
- Check and replenish supplies as necessary to ensure all needed supplies are ready for the next visit.

Appendix AG –
Field and Personal Protective Equipment

FIELD AND PERSONAL PROTECTION EQUIPMENT

Table AG-1 presents a quick reference guide to field and personal protection equipment (PPE) that should be considered, as appropriate, for inspections and sampling events.

Table AG-1. List of Field and PPE Equipment

Field Equipment	
Documents and Recordkeeping Tools • Credentials • Facility File • Inspection Checklists • Log book • Field notebook • Shipping labels • Analysis request forms • Waterproof pen • Calculator • QAPP & Sampling plan • Copy of Permit • Previous Inspection Report • Extra Inspection Checklists • Compliance Assistance Materials (Factsheets, BMP guidance)	**Protective Clothing[1]** • Bump hat • Disposable boot covers • Hearing protection • Safety shoes (waterproof) • Disposable gloves • Protective suit • Reflective safety vest • Safety glasses/goggles • Rainwear • Climate-appropriate outerwear • Change of clothes
Sampling Materials • Prepackaged sampling kit, if available • Sample containers, including extras • Batteries/extension cords • Sample bottle labels/sample seals • Plastic security tape • Chain-of-custody forms • Dissolved oxygen meters • pH meter • Deionized water • Chart paper • Thermometer • Coolers/ice • Preservatives • Directions to laboratory • Shipping labels	**Safety Equipment[1] /Miscellaneous** • First-aid kit • Extra batteries • Sunscreen • Insect repellant • Paper mask • Backpack • Clip board • Water/Fluids • Sun hat • Binoculars • Road Map • Emergency contact information
Sample Transportation Materials • Bubble pack material • Filament tape • Air bill/bill of lading	**Tools** • Multi-tooled jack knife (Swiss Army type) • Electrical and duct tape • Tape measure

Field Equipment	
Flow Measurement Devices • Measurement devices (e.g., flumes, weirs, portable ultrasound or bubble systems) • Flow discharge tables • Level • Ruler • Stopwatch or watch with second hand	• Hand-held range finder and level • Digital camera and extra memory card • Flashlight • Screwdriver • Adjustable wrench and vise grips • Bucket (plastic or stainless steel, as appropriate) • Nylon cord • GPS • Laptop computer • Cell phone and charger • Navigation systems • Pens/pencils • Extra paper • Portable scanner
Biosecurity – Clothing, PPE • Plastic coveralls (disposable outerwear) or cloth coveralls • Standard steel-toed safety boots with disposable boot covers • Disposable gloves (e.g., nitrile, or vinyl) • Hair nets • Filtering face piece (respiratory protection beyond this is not anticipated but if necessary, would require additional supplies and procedures) • Safety glasses with impact protection • Hardhats	**Biosecurity – Supplies** • Water container(s) for potable water • EPA-approved disinfectant and relevant safety data sheets (SDS) • Spray bottle for disinfecting small items • Pump sprayer for disinfecting large items • Long-handled brush • Trash bags and zip-lock bags • Paper towels • EPA-approved soap or antibacterial wipes or products • Bucket • Duct tape to secure plastic boot covers, coveralls, etc. • Waste containers for storing disinfectant rinsate, other liquid waste • Plastic tub for storing “dirty” equipment and PPE in the vehicle • Insect repellant • First aid kit, including tick removal tool

[1] List of Protective Clothing and Safety Equipment is not limited to only Sampling Inspections.

Appendix AH –
Mapping Tool (Region 5)

U.S. EPA REGION 5 FACILITY MAPPING PROTOCOL AND WEATHER DATA SOURCES

When provided with a name and address, look up the coordinates of a facility using Terraserver. Latitude/longitude can also be found with Google Earth.

Create an ArcMap project that has these layers:

- NAIP (National Agriculture Imagery Program)
- NHD Flowlines (National Hydrography Dataset)
- DRG (Digital Raster Graphic)
- Bing Maps Aerial Hybrid Layer
- 303d and 305b (Impaired and Assessed Waters)
- County Street Map or other roads layer
- Existing universe of CAFOs shapefile (It helps to have this layer on to make sure a new facility hasn't already been mapped).

Zoom to the coordinates of the facility.

If a facility does not have a waterway flowing through it, use the distance tool and the DRG to measure the distance to the nearest NHD line following drainage contours on the DRG. If the first NHD line is categorized as "Intermittent", highlight the stretch of waterway path in the NHD layer until it gets to a perennial stream. From those selected stream reach portions, the length (in kilometers) can be summed in the attribute table. Multiply the summed length by 0.62 to get the length in miles to the perennial waterway. Note the direction of the flow off the facility and the distances.

Also make note of the county, impairments and reasons for impairments (if impaired), whether the waterway has been assessed, the road or intersection, and location of nearest town.

Make two maps for each facility, one is zoomed out and one is zoomed in.

The zoomed out map shows enough detail to identify the facility in relation to the closest perennial waterway. Aerial imagery is the background and NHD, 303d and/or 305b are displayed. The facility is identified with a callout box. In the callout box, the flow direction off the facility and distances (to intermittent and perennial) are listed. The title of the map has the facility name and address (if known), the county, the latitude/longitude, and any other location information to help one find the facility when out on the road.

The zoomed in map is zoomed in enough to only display the facility. The callout box is left on this map, but moved to where it is not covering any facility structures. This map is the one that can be used during the inspection to identify the name of each structure, etc.

Rainfall Frequency Tables, Average Annual Rainfall, and Historic Climate Data

Updated 06/18/13

** Some of these links work better with a browser other than Internet Explorer **

Rainfall Frequency

For a given "Rainfall Event", like a 5 year / 2-hour storm, there is a certain amount of rain that would need to fall in that timeframe to be considered a storm of that magnitude.

These rainfall amounts are dependent on where in the country you are located.

There are tables created by NOAA for listing the precipitation frequencies for each state. The document that contains these tables is called NOAA Atlas 14. It was created in 2004 and revised in 2006. There are different volumes of the Atlas for different states. If you want to view the pdf of the atlas for your state, use this link: http://www.weather.gov/oh/hdsc/currentpf.htm

You can use the NOAA Atlas 14 document directly, but it is much easier to use the Precipitation Frequency Data Server. NOAA's Precipitation Frequency Data Server gives output based on the NOAA Atlas for Precipitation Frequency. This is the link for the Precipitation Frequency Data Server: http://hdsc.nws.noaa.gov/hdsc/pfds/index.html

When you open the webpage, leave the default settings for DATA DESCRIPTION. Click on the map in the desired state, and then move the red crosshair to the observation site (or anywhere on the map), scroll to the bottom of the webpage and the server will give you a table for the different rainfall events.

Average Rainfall and Climate Normals

Climate normals are the averages in weather parameters. They were recently updated. The climate normals are calculated on a 30-year average and are updated every 10 years. The new normals, which use the climate data from 1981-2010, were released on July 1, 2011 by the National Climate Data Center.

The NOAA site to get this data is:
http://www.ncdc.noaa.gov/land-based-station-data/climate-normals/1981-2010-normals-data

First choose whether you want Monthly, Daily or Annual/Seasonal Normals. Then choose the state and city of interest.

(You can also access the old 1971-2000 Normals by clicking on the link on the front page. If you want the Daily Normals, click on the Daily Station Normals 1971-2000 (CLIM84) product and search by your location. If you want monthly and annual normals, click on the Monthly Station Normals 1971-2000 (CLIM81) product and find your location.)

Historic Climate Data

Historic climate data beginning the week of April 9, 2012, this data is now free.

For historic climate data, including rainfall, snowfall, and temperature use NOAA's National Centers for Environmental Information. There is a lag of time between the actual date in question and the date that the information is posted on NCEI. This is due to the quality control checks that NCEI performs on the data. NCEI's main website is:
http://www.ncdc.noaa.gov/oa/ncdc.html

To access climate data, go to the website link, above. Once at this website, on the blue banner on the top, click on the Data Access link and then on the Quick Links link. The 23 sections have links for different publications/information. Some of the more popular items one would need are listed below.

Weather Data for One Day or One Month for One Location

In Section 1: "U.S. Local Climatological Data" click on the first link "Quality Controlled Local Climatological Data (QCLCD). Once you click on the "Quality Controlled Local Climatological Data" link, choose the state that you want data for and press Continue. Then Select Desired Station from the choices in the menu. These usually relate to airports, public works offices, or larger cities.

Then choose the desired Year and Month. The next page will allow you to choose one day in that month or choose "E" for the entire month. You also have the option to switch from Daily to Hourly Product.

Note the links in Section 1 for data older than 2005.

Weather Data for the Month or Year for One State

In Section 6: "Climatological Data Publication" you can get the Monthly or Annual reports for one state. After deciding if you need the Individual Monthly Issue or the Individual Annual Issue, follow the menu prompts for your state of interest to get the climate summary from all reporting stations in that state. The next page that comes up will contain a link to the pdf of that report. Click on the link and save the pdf to your computer, renaming it if you desire.

If you are interested in only one site in the Annual Report, you need to first find what division number is associated with your site. One of the last pages will have a map of the state broken up into numbered divisions. Find out which division your site is located in. From the beginning of the report, scroll through the pages until you see a heading for that division. Choose one of the reporting stations within that division.

In the Annual Report, there will be sections for monthly information for:

- Total Precipitation and Departures from Normal
- Average Temperatures and Departures from Normal
- Temperature Extremes and Freeze Data
- Monthly and Seasonal Cooling Degree Days
- Soil Temperatures
- Total Pan Evaporation and Wind Movement (not usually complete for all stations)

Storm Data and Unusual Weather Phenomena

In Section 5, you can get reports by month of severe storm events. The reports have all the states listed and the state data is broken up by region (Central, Northwest, etc.) and county. It will list the date of the event, time, damage done to property and crops and the character of the storm.

Hourly Precipitation Data

In Section 7, you can get a statewide listing by month of the hourly precipitation reports.

Weather Data from National Weather Service

For recent weather that has not been archived, like within the past few months, there are numerous web-sites that make this available. Realize that the weather data is not "official" until it has been quality control checked by NCDC, though.

One website that you can use is the National Weather Service. http://www.weather.gov/

Click on the map in the location you are interested in and the website will navigate to the page of the Weather Forecast Office for that area. On the left hand side of the page will be a link for the Local Climate. Clicking on that link brings you to a page that gives you a choice of products, a location and the timeframe of the weather data you want.

The first product, the Daily Climate Report, is what you would use to see the temperature, precipitation, and other weather conditions on that one day. There are other products that may be of better use, depending on what you are looking for.

The locations offered on this page are the locations that are certified by the National Weather Service. You may not be able to get all products for all the locations.

Appendix AI –
Sample Permitted CAFO Inspection Checklist

SAMPLE PERMITTED CAFO INSPECTION CHECKLIST
PERMITTED CAFO SITE INSPECTION FORM

GENERAL INFORMATION:

NPDES Permit No.:	NPDES Permit Expiration Date: ___/___/___
Facility ID # _____	Inspector _____
Facility Name _____	Date _____
Facility Owner _____	Time in _____ Time out _____
Facility Operator _____	Weather _____
Mailing Address _____ _____	GPS Reading (at gate) North _____
Physical Address _____	[28]West _____
County _____	Section _____ Township _____ Range _____
Contact Person _____	Does the facility owner/operator own and/or operate any other animal feeding operations? Y or N
Phone (office)_____(cell)_____ (fax) _____	If yes provide name(s) and address(es) and indicate whether the facility is an AFO or a CAFO
E-mail _____	_____
Persons Present During Inspection _____ _____ _____	_____ _____

[28] Longitude reading should be a negative number (i.e., -105.2356).

Max. Animals Confined per Month_____ Max. Capacity of Facility_____ Permitted Capacity of Facility _____ Number of animals today (all animals in production area):		Location and name of nearest surface water[29] and description of flow path _____ _____ _____	
	# confined		# confined
Cattle		Sheep	
Dairy mature		Dairy heifers	
Swine (≥55#)		Swine (<55#)	
Turkeys		Laying hens	
Other chickens		Other (specify)	

☐	Presented credentials? (check if yes)
☐	Aerial image attached? (check if yes) Source and date: _____
☐	Inspection photos attached? (check if yes)
☐	Potential compliance issues? (check if yes and summarize below)

_____
_____
_____
_____
_____
_____
_____

[29] Surface water means all waters of the United States.

INSPECTION OBSERVATIONS:

Production Area

1. List impoundments (attach additional sheet(s), if needed)

Impoundment ID	Wastewater Type	Wastewater Source(s)	Pumping level[30] (from staff gauge)	Wastewater below pumping level?	Max. recorded level	Date of max. recorded level
	☐ process generated ☐ runoff			Y or N		
	☐ process generated ☐ runoff			Y or N		
	☐ process generated ☐ runoff			Y or N		
	☐ process generated ☐ runoff			Y or N		
	☐ process generated ☐ runoff			Y or N		
	☐ process generated ☐ runoff			Y or N		

2. Impoundment(s) collect all runoff from:

Y N n/a Animal confinement areas? [31]

Y N n/a Manure storage areas? [32]

Y N n/a Raw material storage areas?[33]

Y N n/a Waste containment areas?[34]

Y N n/a Egg washing or egg processing facility?

Y N n/a Mortality storage, handling, treatment or disposal area?

[30] The pumping level represents the minimum capacity necessary to contain runoff and direct precipitation from the 25-year, 24-hour rainfall event (40 CFR Part 412.37(a)(2)).

[31] Animal confinement area includes but is not limited to open lots, housed lots, feedlots, confinement houses, stall barns, free stall barns, milkrooms, milking centers, cowyards, barnyards, medication pens, walkers, animal walkways, and stables (40 CFR Part 122.23(b)(8)).

[32] Manure storage area includes but is not limited to lagoons, runoff ponds, storage sheds, stockpiles, under house or pit storages, liquid impoundments, static piles, and composting piles (40 CFR Part 122.23(b)(8)).

[33] Raw materials storage area includes but is not limited to feed silos, silage bunkers, and bedding materials (40 CFR Part 122.23(b)(8)).

[34] The waste containment area includes but is not limited to settling basins, and areas within berms and diversions which separate uncontaminated storm water (40 CFR Part 122.23(b)(8)).

Y N n/a Other? (describe): _____

- If no, describe non-retained areas:

_____

_____

Y N n/a 3. Was manure or wastewater observed in a waterway? If yes, describe:

_____

_____

Y N n/a 4. Adequate storage available for manure, litter, and process wastewater, and procedures are in place to ensure proper operation and maintenance of the storage facilities? [Part 122.42(e)(1)(i)]

]_____

_____

Y N n/a 5. Confined animals do not have direct contact with waters of the United States? [Part 122.42(e)(1)(iv)]

_____

_____

Y N n/a 6. Clean water is diverted from the production area? [Part 122.42(e)(1)(iii)]

_____

_____

Production Area (continued)

Y N n/a 7. Chemicals and other contaminants handled on-site are not disposed of in any manure, litter, process wastewater, or storm water storage or treatment system? [Part 122.42(e)(1)(v)]

_____

_____

Additional Production Area Requirements for Large Dairy Cow, Cattle, Swine, Poultry, and Veal Calf CAFOs (Subparts C and D)

Y N n/a 8. All open surface impoundments and terminal storage tanks have depth markers which clearly indicate the minimum capacity necessary to contain the runoff and direct precipitation of the 25-year, 24-hour rainfall event? [Part 412.37(a)(2)]

_____

_____

Y N n/a 9. Mortalities remain on the production area until disposal, are not disposed in liquid manure or process wastewater treatment systems, and are handled to prevent discharge of pollutants to surface waters? [Part 412.37(a)(4)]

_____

_____

Production area comments:

_____

_____

_____

_____

_____

Land Application Sites

Y N n/a 10. Does the facility apply manure or wastewater to land owned by or under the operational control of the CAFO?

- Number of land application sites:

  _____
- Irrigation type(s):

  _____
- Furrow/flood irrigation sites – what is fate of applied wastewater and tailwater?

  _____

Y N n/a 11. Was manure/wastewater applied in accordance with the procedures and protocols identified in the NMP? (s*pot check records for one for one field to complete the information below.)*

If no, describe:

_____

_____

Field ID:		**Acreage:**		**P Index:**		**Calculations based on:** ☐ N or ☐ P
		Calculated*		**Applied**		
		Gal. or Tons (specify)	Lbs. N or P	Gal. or Tons (specify)	Lbs. N or P	
Rates of application:	Liquid					
	Slurry					
	Solid					
Total Lbs. N or P that may be applied and that were applied:						
*If rates are calculated for more than one form, are the rates ☐ additive (e.g. slurry *and* solid) or ☐ exclusive (e.g., slurry *or* solid)?						

****Copy record(s) including rate calculations, land application records and any other relevant documentation.****

Land application site comments:

_____

_____

Land application site comments (continued):

_____

_____

_____

_____

Monitoring, Documentation and Recordkeeping

Does the facility maintain records of the following for 5 years?

Y N n/a 12. The completed permit application? [Part 412.37(b)]

Y N n/a 13. The current design of manure storage structures, including volume of solids accumulation, design treatment volume, total design volume, and approximate number of days of storage capacity? [Part 412.37(b)(5)]

Y N n/a 14. The date, time, and estimated volume of any overflow? [Part 412.37(b)(6)]

Y N n/a 15. Manure and process wastewater transfers, including the most current nutrient analysis of the manure or wastewater that was provided to the recipient, the date and approximate amount transferred, and the name and address of the recipient? [Part 122.42(e)(3)]

Y N n/a a. Name of recipient

Y N n/a b. Address of recipient

Y N n/a c. Date of transfer

Y N n/a d. Approximate amount transferred (tons/gallons)

Y N n/a e. Recent (12 months or less) manure nutrient analysis provided

Additional Production Area Records for Large Dairy Cow, Cattle, Swine, Poultry, and Veal Calf CAFOs

16. Documentation of daily and weekly visual inspections of the production area, including:

Y N n/a a. Weekly inspection of stormwater diversions, waste storage structures, and process wastewater channeling devices? [Part 412.37(b)(1)]

Y N n/a b. Daily inspection of water lines? [Part 412.37(b)(1)]

Y N n/a c. Weekly inspection of impoundments and tanks? [Part 412.37(b)(1)]

Y N n/a 17. Weekly records of the depth of manure and process wastewater in liquid impoundments and terminal tanks? [Part 412.37(b)(2)]

Y N n/a 18. Documentation of actions taken to correct deficiencies found as a result of production area inspections? [Part 412.37(b)(3)]

Y N n/a 19. Documentation of mortalities management? [Part 412.37(b)(4)]

Land Application Area Records for Large Dairy Cow, Cattle, Swine, Poultry, and Veal Calf CAFOs

Y N n/a 20. Expected crop yields? [Part 412.37(c)(1)]

Y N n/a 21. Date(s) manure or process wastewater is applied to each land application site? [Part 412.37(c)(2)]

Y N n/a 22. Weather conditions at the time of, and for 24 hours prior to and following, land application? [Part 412.37(c)(3)]

Y N n/a 23. Test methods used to sample and analyze manure, process wastewater, and soil? [Part 412.37(c)(4)]

Y N n/a 24. Results from manure, process wastewater, and soil analyses? [Part 412.37(c)(5)]

Y N n/a 25. Manure and process wastewater application rates determined in accordance with the technical standards? [Part 412.37(c)(6)]

Y N n/a 26. Calculations showing the total N and P to be applied to each land application site, including sources other than manure or process wastewater? [Part 412.37(c)(7)]

Y N n/a 27. Total amount of N and P actually applied to each land application site, including calculations? [Part 412.37(c)(8)]

Y N n/a 28. Method used to apply manure and process wastewater? [Part 412.37(c)(9)]

Y N n/a 29. Date(s) of manure application equipment inspections for leaks? [Part 412.37(c)(10)]

Monitoring, Documentation and Recordkeeping comments:

_____

_____

_____

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Nutrient Management Plan (NMP)

Required NMP Element [Part 122.42(e)(1)]

Y N n/a 30. Is the facility's NMP available on-site? Does it reflect the current operational characteristics and practices? [Part 122.42(e)(2)(ii)]

Date developed or last revised: _____

Y N n/a 31. Ensure adequate storage of manure and process wastewater, including operation and maintenance procedures.

Y N n/a 32. Ensure proper management of animal mortalities.

Y N n/a 33. Ensure that clean water is diverted, as appropriate, from the production area.

Y N n/a 34. Prevent direct contact of confined animals with surface waters.

Y N n/a 35. Ensure proper disposal of chemicals and other contaminants.

Y N n/a 36. Identify site-specific conservation practices to control runoff of pollutants

Y N n/a 37. Identify protocols for manure, process wastewater, and soil sampling and testing.

Y N n/a 38. Establish protocols to land apply manure or process wastewater in accordance with site-specific nutrient management practices that ensure appropriate agricultural utilization of the nutrients in the manure, litter, or process wastewater.

Y N n/a 39. Identify specific records that will be maintained to document the implementation and management of the minimum NMP elements (#36-#43 above).

Additional NMP Requirements for Large Dairy Cow, Cattle, Swine, Poultry, and Veal Calf CAFOs

Y N n/a 40. Application rates are calculated as required by Part 412.4(c)(2)

Y N n/a 41. Specifies the manure, process wastewater, and soil sampling at the required frequencies and for the required parameters? [Part 412.4(c)(3)] *(manure/wastewater annually for P & N, soils at least every 5 years for phosphorus transport)*

Y N n/a 42. Includes periodic inspection of land application equipment? [Part 412.4(c)(4)]

Y N n/a 43. Includes 100-foot setback, 35-foot vegetated buffer, or approved alternative? [Part 412.4(c)(5)]

Where applicable, identify each field and setback type:

Field ID	Setback Type

OVERALL COMMENTS:

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

ADDITIONAL NOTES

_____

_____

_____

FACILITY MAP

PHOTOS

Photo No.	*Description*

Inspector: _____

Date: _____

Date Inspection Report was Finalized: _____

Date Report was Sent to Facility: _____

Appendix AJ –
Regional Inspections Checklists

REGIONAL INSPECTION CHECKLIST

PROGRAM YEAR 2011 GEORGIA DEPARTMENT OF AGRICULTURE LIVESTOCK/POULTRY FIELD FORCES AFO/CAFO INSPECTIONS	LAS D S CL

GENERAL INFORMATION:

Inspector's Name:		Inspector's Number:	
GDA Est #:	Landowner's Name:		Date:
Landowner's Mailing Address:			County:
City:	State:	Zip:	Phone#:
Farm Name:	Person Permit Issued to:		
Farm Physical Address:			
City:	Zip:	County:	Phone#:
Landowner's E-mail:		Operator's E-mail:	
Certified Animal Feeding Operator:			Certification #:
Operator's Mailing Address:			
Copy of Certificate on-site: ❑ Yes ❑	# Hours of Continuing Education Last Year:		
Documentation for Continuing Education provided to GDA: ❑ Yes ❑ *No			
Comments:			

RECORDS:

NPDES Permit #		Copy of Permit on-site ❑Yes ❑ *No	
Has Permit been extended: ❑ Yes ❑ *No	Copy of Permit Extension on-Site: ❑ Yes ❑ *No		
NPDES Annual Report Submitted letter on-site: ❑ Yes ❑ *No		Date Submitted:	
Size and Type of Operation: ❑ Swine ❑ Dairy ❑ Commercial Layer			
Does this CAFO have an **approved** NMP? ❑ Yes ❑ *No ❑ Pending (only if NMP is submitted)			
Date of NMP approval by EPD:	Copy of approved NMP on-site: ❑ Yes ❑ *No		
Has farm completed an annual assessment of NMP? ❑ Yes ❑ *No			

If "yes" list changes that have been made to the operation since last inspection?
Are Daily Rain Records on-Site: ❑ Yes ❑ *No

Weekly Log of Waste Water Impoundment Liquid Level on-Site? ❑ Yes ❑*No	
Date of last recorded Liquid Level measurement: (NPDES weekly)	
Are Records of Weekly Inspection & Maintenance of all manure storage & handling structures, and run off management on-site? ❑ Yes ❑ *No	
Liquid Application records on-site: ❑Yes ❑ *No	**COMPLETE PAGE 2A - before continuing**
Does it appear the farm is over applying in regards to their NMP? ❑ Yes ❑ *No	
Does liquid application records contain field, acres, date, rate, crop, crop yield, duration of irrigation, number of sprinklers, total volume applied, and total nitrogen applied? ❑Yes ❑ *No ❑ *Partial	
If farm has a solid separator how much is applied on the farm tons? ❑ Not applicable	
Does solid application records contain field, acres, date, rate, crop, crop yield, ❑Yes ❑ N/A total volume applied, and total nitrogen applied, or total nitrogen per acre? ❑ *No ❑ *Partial	
Is Commercial Fertilizer applied to fields where any type of manure is applied? ❑ Yes ❑ No If answer is "Yes" provide analysis of fertilizer and quantity applied per acre: Does the approved NMP include commercial fertilizer in the nutient budget worksheet? ❑Yes ❑ *No	
Any Rental/Lease agreements for manure/waste water applied off farm? ❑ Yes ❑ No ❑ N/A Are the agreements included in the NMP? ❑ Yes ❑ *No	
Are all Application fields on map(s) included in NMP? ❑ Yes ❑ *No	
What is the maximum liquid level in the NMP (measured downward from top of embankment):	
Comments:	
APPLICATION EQUIPMENT:	
Specify Type of Liquid Manure Application Equipment:	
Is Equipment? ❑ Owned ❑ Rented or Leased ❑ Custom Applied	

Date of last Calibration?	**Attach Copy of Annual Calibration**	
Specify Type of Dry Manure Application Equipment:		❑ N/A
Is Equipment? ❑ Owned	❑ Rented or Leased	❑ Custom Applied
Date of last Calibration?	**Attach Copy of Annual Calibration**	
Solids Separator: ❑ Yes ❑ No	Pad Type:	❑ Open Area ❑ Under Shelter
Is storage pad area covered, bermed, curbed, and guttered, or buffered? Describe.		
Are record available showing maintenance of application equipment?		❑ Yes ❑ *No
Comments:		

SOIL/WASTE WATER/MANURE/MONITORING WELL TESTING:	
Date, time, exact location, and name of person responsible for most recent manure and waste water sampling, soil sampling, and monitoring well sampling.	
Manure:	Testing
Waste Water:	Testing
Soil:	Testing
Monitoring Well:	Testing
Semiannual manure, separated solids, waste water analysis.	❑ Yes ❑ *No
Records of annual soil sampling of each application field.	❑ Yes ❑ *No
Does the annual soil sampling report include soil pH and soil test? Phosphorus level measured by Mehlich-1 Extraction or Double Acid?	❑ Yes ❑ *No
Are Records on-site showing date, name, and address of recipients, quantity of manure and nutrient analysis of manure transferred to others?	❑ Yes ❑ *No ❑ *N/A
Comments:	
MONITORING WELLS:	
Are the monitoring wells shown on the NMP Maps?	❑ Yes ❑ *No
If no, has plan for installation of monitoring well been submitted?	❑ Yes ❑ *No
Does the facility have monitoring wells for each waste water system?	❑ Yes ❑ *No

Does the facility have a monitoring well down gradient of lagoon/storage pond?	❑ Yes ❑ *No
Does monitoring well records show Nitrate Nitrogen level greater than 1Oppm?	❑ Yes ❑ *No
What were the results for last year? (2) and dates taken.	❑ Yes ❑ *No
Describe any actions taken to reduce level of Nitrate Nitrogen.	
Comments:	
EMERGENCY ACTION PLAN:	
Does this operation have an Emergency Action Plan?	❑ Yes ❑ *No
Is the plan included in the NMP?	❑ Yes ❑ *No
Are Emergency numbers posted for all employees to attain?	❑ Yes ❑ *No
Emergency Operations Center 24 Hour Spill Reporting should be contacted to report overflow and discharges in cases where EPD District Office personnel are not available. Spill Reporting Telephone Number is **(800) 241-4113**	
Comments:	
ANIMAL MORTALITY:	
Describe the animal mortality plan for this operation:	
Has a soil investigation been conducted for the disposal site? If "no", give the date that investigation is to be performed:	❑ Yes ❑ No
Does this facility have a catastrophic mortality disposal plan?	❑ Yes ❑ *No
Does facility have verification of approved burial site?	❑ Yes ❑ *No
Comments:	
OUTSIDE INSPECTION	
MEDICAL/CHEMICAL BY-PRODUCT DISPOSAL:	
Does this operation have a disposal plan for disposing of medical and/or chemical waste and preventing introduction into manure or wastewater except when used in accordance with the product label?	❑ Yes ❑ No
If "yes" briefly describe method?	
Is there evidence of oil, petroleum based products, or chemical spills on-site?	❑ Yes ❑ No

Comments:	
MONITORING WELL:	
Are monitoring wells being maintained properly and kept free of grass, weeds, and animal burrows? ❑ Yes ❑ No	
Are the monitoring wells installed in location on maps? ❑ Yes ❑ No*	
Comments:	
ANIMAL MORTALITY:	
Does it appear that animal mortality disposal through observation meets current Department of Agriculture Rules? ❑ Yes ❑ No	
Comments:	
DIVERSION OF CLEAN WATER:	
Is storm water diverted from waste water impoundment? ❑ Yes ❑ No	
If "yes", are the diversion provisions being properly implemented and maintained? ❑ Yes ❑ No	
If "no", is the runoff being collected and is the storage volume of waste water impoundment designed to contain the runoff? ❑ Yes ❑ No	
Is runoff from open lots, holding pens, and loafing areas buffered or diverted into the waste water storage system? ❑ Yes ❑ No	
Are steps being taken to prevent water wastage? ❑ Yes ❑ No	Is the facility recycling? ❑ Yes ❑ No
Do livestock have access to surface waters on the farm while in confinement? ❑ *Yes ❑ No	
Is all waste water diverted into the waste water impoundment? (including hoof wash, parlor, holding areas, etc.). ❑ Yes ❑ *No	
Comments:	
WASTE WATER IMPOUNDMENT STRUCTURE:	GPS: N W
Is embankment(s) grassed, free of erosion, rodent tunnels, cracks or other damage? ❑ Yes ❑ *No	
If "no" describe:	
Is embankment free of woody vegetation, briars, etc. ❑ Yes ❑ *No	
Date of last brush and/or weed control (mowing, spraying, etc.) of the embankment:	
Does waste water impoundment have a permanent depth marker with? maximum liquid level indicated? ❑ Yes ❑*No	
Estimated number of inches between liquid level and lowest point on top of berm/embankment/dam at the time of inspection:	
Is liquid level at time of inspection above or below maximum liquid level stated in NMP? ❑*Above ❑Below	
Is this waste water storage structure a zero discharge structure? ❑ Yes ❑ *No	
Does it appear that the waste water storage structure has had a recent overflow? ❑ *Yes ❑ No	

If "yes", was the overflow the result of a chronic or catastrophic event?		❑ Yes	❑ No
Describe the event; include date, time and estimated amount of volume:			
If overflow resulted in a discharge, give test results of the BODS and TSS levels:			
Liquid level before overflow:	Liquid level after overflow:		
If, for any reason, there is a discharge of pollutants to a water of the US, the permittee is required to make immediate oral notification within 24-hours to the local Division District Office (or, if after office hours, the Georgia Department of Natural Resources Emergency Operations Center, 1-800 -241-4113) and notify the Division District Office in writing within five (5) working days of the discharge from the facility.			
Comments:			
APPICATION EQUIPMENT & LAND APPICATION SITE:			
Is Liquid Manure Application Equipment?	❑ Owned	❑Rented/Leased	❑ Custom
Is Dry Manure Application Equipment?	❑ Owned	❑Rented/Leased	❑ Custom
Is there a vegetated buffer between the application fields and down? gradient surface waters, sinkholes, open tile line intake structures, etc.?		❑ Yes	❑ No
Estimated width of the vegetated buffer in feet:			
Are ditches, grassed waterways, terraces, diversions, swales or other water conveyance in the application fields?		❑ Yes	❑ No
Is land application of manure/waste water is being applied at agronomic rates?		❑ Yes	❑ No
Is there evidence of improper land application of manure and/or waste water in wet zones, such as wetlands, drainage ditches, flooded areas, applying during a rainfall event, on frozen field, or runoff entering streams?		❑ Yes	❑ No
If "yes" describe:			
Comments:			

The Georgia Department of Agriculture's review of the animal feeding operation does not relieve the operator from adherence to provisions and requirements contained in the Land Application System (LAS) or National Pollution Discharge Elimination System (NPDES) permit issued for the feeding operation or to rules and regulations issued by the Georgia Department of Natural Resources (DNR), Environmental Protection Division (EPD) and/or US Environmental Protection Agency (EPA).

Any violation identified on this inspection report must be addressed immediately and a completion date agreed to by the producer. Any violation that results in a discharge or damage to the "Waters of the State" will be reported immediately to the Department of Natural Resources, Environmental Protection Division.

Re-inspection Date: (If Needed)_____

Farm Representative/Title	Date	GDA Representative

Inspection was reviewed for completeness and adequacy by:_____Date :_____

Inspection was reviewed for completeness and adequacy by:_____Date :_____

Inspection should have 2-A, Calibration Documentation and Inspection Summary attached.

Contacts:
Environmental Management District Offices:

Mountain District (Cartersville)	P.O. Box 3250, Cartersville, Ga 30120-1705	(770) 387-4900
West Central District (Macon)	2640 Shurling Drive, Macon 31211-3576	(478) 751-6612
Costal District (Brunswick)	400 Commerce Center Dr, Brunswick 31523-8251	(912) 264-7284
Southwest District (Albany)	2024 Newton Road, Albany 31701-3576	229) 430-4144
Northwest District (Athens)	745 Gaines School Rd, Athens 30605-3129	706) 369-6376
Northeast District (Augusta)	1885-A Tobacco Road, Augusta 30906-8825	706) 792-7744
Mountain District (Atlanta)	4244 International Parkway St 101, Atlanta, Ga 30354	404) 362-2671

A copy of this Report was mailed or e-mailed to the _____
District Office of EPD by _____
on (date) _____

A. GENERAL INFORMATION (Shaded boxes are for inspector to fill in independently)					
FACILITY NAME (**LLC, Inc., Corp, Partnership, sole proprietorship, etc. If facility representative is unsure look under the Secretary of State's website to see if it is listed.**)				INSPECTION DATE	ARRIVAL TIME
ADDRESS				INSPECTOR(s) INITIALS	DEPARTURE TIME
CITY	STATE	ZIP CODE		STATE INSPECTOR (if present)	
LEGAL DESCRIPTION (latitude and longitude)		COUNTY		TEMPERATURE	PRECIPITATION TYPE

Facility Owner(s) (Ask for formal name and obtain a business card, letter head or other documentation)	NAME	PHONE
	NAME	PHONE
Facility Operators (If different than the owner)	NAME	PHONE
	NAME	PHONE

Is the Animal Facility a CAFO? YES NO	CAFO Classification? (Medium or Large?)	CAFO Designation Date (If a designated CAFO)	Designation Reason (If a designated CAFO)

TYPE OF OPERATION (Circle all that apply)	NUMBER OF ANIMALS OF EACH TYPE (Present at time of inspection)	CAPACITY	TYPE OF CONFINEMENT (Open Lot, Partial or Total Confinement, Pasture)
BEEF CATTLE			

DAIRY (Mature and Dry) SWINE HEIFERS/CALVES TURKEYS CHICKENS OTHER			

1.	What number of animals are stabled/confined and feed/maintained for 45 days or more during a twelve-month period? Get documentation (computer records, daily records) for the past year that provides the number of animals on facility each month.			
2,	What are the minimum number of animals that you have had at this facility since the date of operation			
3.	What are the maximum number of animals that you have had at this facility since the date of operation			
4.	Do the animals have direct access to waters of the United States and/or its tributaries?		YES	NO
5.	Does the facility have the ability to discharge livestock waste to waters of the US via a manmade conveyance?		YES	NO
6.	Are any crops, vegetation, forage growth, or post-harvest residues sustained in the normal growing season over any portion of the lot or facility where animals are kept?		YES	NO
7.	What is the total area (acres) devoted to production? (Includes buildings, manure storage areas, feedlots, chemical buildings, and offices. If a large facility this also includes land application area. Not pasture.)			
8.	What is the total area (acres) devoted to pasture?			
9.	Is the facility currently operating under a National Pollution Discharge Elimination System (NPDES) permit? If yes, indicate NPDES ID.		YES	NO
10.	(ILLINOIS ONLY) Are you a Certified Livestock Manager (300 or greater ***animal units***)? (Should have a certificate that they were certified by the Dept. of Agriculture.) (Ask to see it if they have one.)	N/A	YES	NO
11.	(ILLINOIS ONLY) If greater than 1000 ***animal units*** but less than 5000 ***animal units***, a general waste management plan shall be prepared and maintained on file at the facility. If this applies, is plan maintained at the facility? (Ask to see it if they have one.)	N/A	YES	NO
12.	(ILLINOIS ONLY) If greater than 5000 ***animal units*** a waste management plan must be prepared, maintained and submitted to the Dept. of Agriculture. If this applies, did facility do this requirement? (Ask to see it if they have one.)	N/A	YES	NO

13.	Does the facility have a current NMP or CNMP? (Details gathered in Section G, but facility representative may need to begin looking for it now)	YES	NO
14.	Does the facility have any other locations under common ownership, or where equipment and/or manure is shared, or where the other site shares land application sites? If so, put names and addresses below.	YES	NO
15.	Number of Employees (not counting immediate family members)?		

B. MANURE, LITTER, AND PROCESSED WASTEWATER STORAGE TYPE		
Type of Storage	**Storage Capacity**	**Days of Storage**
Storage Lagoon		
Holding Pond		
Above Ground Storage Tanks		
Below Ground Storage Tanks		
Roofed Storage Shed		
Concrete Pad		
Impervious Soil Pad		
Underflow Pits		
Anaerobic Digester		
Outdoor Piles		
None		
Other		

C. LIVESTOCK WASTE MANAGEMENT AND MORTALITIES			
1.	Does the facility have any existing livestock waste management systems? **If yes, continue filling out Section C.** **If no, then proceed to Section D.**	YES	NO
2.	Provide a detailed description of the waste management system. (Include structure types, capacity and condition. Include solid and liquid manure handling, and mortality.)		
3.	Does the system have a managed outfall or discharge point?	YES	NO
If Yes, please provide a detailed description. (Riser pipe, spill way, etc. Include a description the area receiving the discharge.)			
4.	Are there any portions of the production area where runoff is not controlled?	YES	NO
If Yes, provide a detailed description of the area(s) of concern:			
5.	Who designed the storage structures?		
6.	Did you receive help from any organization (like NRCS) in the design of the storage structure? If so, who?		
7.	In what year were the storage structures constructed?		
8.	Does the facility have the As-Built for the storage structures? (Ask to see them and note sizes of ponds/lagoons in gallons.)		
9.	What type of lining is used for the storage structures? (Example: clay, concrete, plastic, etc.)		
10.	Do the storage structures have depth markers or staff gauges?	YES	NO
11.	Are levels of manure in the storage structures recorded and records kept? (If YES, ask to see records. Photograph them or get copies.)	YES	NO

12.	Total number of acres available for land application?		
13.	When was the last time the storage structure was pumped down? (If within the past two months, fill out section I.)		
13.	Are land application records kept? (If YES, ask to see records. Photograph them or get copies.)	YES	NO
14.	Is manure transferred off-site to another party?	YES	NO
15.	Are records of manure transfers kept? (If YES, ask to see records. Photograph them or get copies.)	YES	NO
16.	Do the facility personnel perform routine visual inspections of the production area?	YES	NO
17.	Are the routine visual inspections documented? (If YES, ask to see records. Photograph them or get copies.)	YES	NO
18.	How are mortalities managed? (Composted, buried, burned, rendering service, other) (Get name of rendering service if rendered.)		
19.	Are mortalities documented and are records kept? (If YES, ask to see records. Photograph them or get copies.)	YES	NO
Water Sources that Need to be Contained			
20.	What type of method is used to provide drinking water for the animals? (Circle one) Overflow waters Tip Tanks Nipple waters (if nipple waters are used for swine, is backflow prevention installed?) Other (describe)		
21.	How is the water for animals contained?		
22.	Is a mist cooling system used?	YES	NO
If YES, describe how mist water is contained?			
23.	Is this a dairy operation? **If yes, answer the following questions in this section.** **If no, go on to the Bedding section.**	YES	NO
24.	How many times per day are cows milked?		
25.	Describe how non-contact cooling water (or also called plate-cooler water) is contained? (Example: It is reused for drinking water for the animals.)		
26.	Describe how the milking parlor is cleaned (hose or flush) and where the process wastewater goes and how it is contained.		
27.	Describe how the tank(s) are washed and where the process wastewater goes and how it is contained.		
28.	Describe where teat dip containers and waste barrels are located.		
29.	Describe where the Copper Sulfate or Formaldehyde (for the foot baths) is located (both unused and used).		
Bedding			
30.	Describe what type of bedding is used for the animals. (Is a different type of bedding used for young animals?)		
31.	Describe how bedding is collected and how often.		

32.	What is done with the used bedding? REUSED LAND APPLIED		
Manure Collection			
33.	How is manure collected? (Circle one) Scraped: Automatically Manually Scrape/Gravity (Scraped to middle or end of barn to a pipe that gravity feeds to storage structure) Scrape/Flush (Barns flushed with water after scraping) Flush (Cleans out barns with clean or reused water) Vacuum (Solids are separated by a vacuum before entering storage pond) Other (Describe this)		
34.	Amount of manure generated annually? Liquids: Solids:		
35.	If manure collection system uses either clean or reused water to flush, describe where this water comes from. (Storage pond, well water, city water, etc.)		
36.	If manure collection system uses either clean or reused water to flush, describe where this water goes and how it is contained.		
Manure Storage			
37.	Is manure stored for the short term? (Daily haul, small pits/storage)	YES	NO
If YES, indicate for how long manure is stored for the short term.			
How is the short term storage drained? GRAVITY AUTOMATICALLY PLUG			
If Automatically, is there a backup power system in place?		YES	NO
If YES, describe the backup power system.			
38.	Where is manure stored for long term and for how long (Also asked in Section B)? Concrete pit under floor (how long stored here?) _____ Concrete storage structure outdoors _____ Earthen storage structure outdoors _____ Slurry storage structure _____ Other (Describe this) _____		

Safety			
1.	Are there barriers guarding the end of any manure push-off platforms?	YES	NO
2.	Is there fencing around earthen manure storage structures?	YES	NO
3.	Are facility personnel trained for safety with large farm animals and safe work practices?	YES	NO
4.	Are facility personnel trained in skid steer operations?	YES	NO
5.	Are facility personnel trained in tractor operations?	YES	NO
6.	Are facility personnel trained in or kept out of confined spaces?	YES	NO
7.	Are facility personnel trained in safety procedures during the maintenance of equipment?	YES	NO
8.	Are belts, pulleys, chains and sprocket guards intact on farm machinery?	YES	NO
9.	Are MSDSs maintained on-site for all chemicals used on the facility?	YES	NO
10.	Does farm equipment have roll over protective devices (ROPS)	YES	NO
11.	Have facility personnel been trained in hazard communications?	YES	NO
Feed Storage Containment			
38.	Describe how feed is contained, including type of storage structure, capacity and type of feed.		
39.	Describe how feed runoff is contained.		
D. RECEIVING SURFACE WATERS			
1.	Provide a detailed description of the flow path from the facility to the nearest named surface water. (Include detailed descriptions of all unnamed tributaries, ditches, and/or other flow paths *i.e.,* depth, width, color, odor, slope, amount of water present, soil type, erosivity, etc. Ask for local name of ditches/streams.)		
2.	Are there any man-made features not associated with the production area that can affect runoff?	YES	NO

If Yes, provide a detailed description.			
3.	Are there any storm water pathways entering the facility?	YES	NO
4.	Are there any clean water/storm water ponds on-site?	YES	NO
5.	What is the name of the receiving stream and the names of next streams or rivers in flow path?		
6.	How many months out of the year does the receiving stream/ditch have flow in it?		
7.	What is the name of the first navigable water?		
8.	Status of the named surface water? Intermittent Perennial		
What was the State's designation for this Surface water? *(if –applicable)*			
Is this surface water or subsequent tributary listed as an impaired water on the current state 303(d) list?		YES	NO
If YES, what is the impairment?			
E. DISCHARGES			
1.	What is the 25-year, 24-hour rainfall amount for this location? You can find out this information from the Precipitation Frequency Data Server: http://hdsc.nws.noaa.gov/hdsc/pfds/index.html		
2.	Have there been any documented discharges of livestock waste to surface water ***in the past year***? **If YES, answer parts a – i below. If NO, go to part F.**	YES	NO
a.	Specify the date(s).		
b.	What was the reason for the discharge?		
c.	What was the duration?		
d.	What was the volume?		
e.	Was the discharge the result of a 25 year, 24-hour rainfall event?	YES	NO
f.	What was the precipitation amount? *(if applicable)*		
g.	Were EPA and/or the State notified?	YES	NO

h. Provide a detailed description of the flow pathway and the area(s) receiving the discharge(s). *(include Photographs)*			
i. Has the facility taken corrective action to remedy the situation which caused the discharge(s)?		YES	NO
If YES, describe actions taken:			
3.	Is the facility currently discharging livestock waste from the production area? (This can be seen during the walk-through of the facility.)	YES	NO
What is the reason for the discharge?			
4.	Is the discharge the result of a 25 year, 24-hour rainfall event?	YES	NO
5.	What was the precipitation amount immediately before this discharge? *(if applicable)*		
6.	Was a sample taken? *If YES, then fill out Section G.*	YES	NO
Provide a detailed description of the flow pathway and the area(s) receiving the discharge(s).			
F. NPDES PERMIT INFORMATION (If no NPDES Permit, skip this section)			
1.	What type of NPDES permit has been issued? (Circle one.) Individual NPDES Permit General NPDES Permit	NPDES #	
2.	What date was the NPDES permit issued?		
3.	What date does the NPDES permit expire?		
4.	Is a copy of the NPDES permit onsite?	YES	NO
5.	Permitted number of animal units?		
6.	Does the NPDES Permit contain a compliance schedule?	YES	NO
If YES, provide a detailed description of the requirements in the compliance schedule and their status.			
7.	Have there been any changes made to the production area since the permit was issued?	YES	NO

If YES, provide a detailed description of those changes.			
8.	Does each open surface liquid impoundment have an adequate depth marker (e.g., staff gauge)?	YES	NO
9.	Are liquid levels recorded in accordance with the NPDES permit?	YES	NO
10.	Is the facility maintaining adequate storage capacity in each manure or litter storage structures?	YES	NO
11.	When storage capacity is not available, are all structures dewatered/emptied in accordance with the NPDES permit?	YES	NO
12.	Are manure solids stored onsite in accordance with the NPDES permit?	YES	NO
13.	Is manure transferred off-site in accordance with the NPDES permit?	YES	NO
14.	Are records of off-site manure disposal being maintained in accordance with NPDES permit?	YES	NO
15.	Is the facility performing routine visual inspections of the production area in accordance with the NPDES Permit?	YES	NO
16.	Are the visual inspections documented?	YES	NO
17.	Are mortalities managed and disposed of in accordance with the NPDES Permit?	YES	NO
18.	Is mortality management documented?	YES	NO
19.	If you answered NO for any of the questions 6-18, then provide a detailed description of the potential permit violation(s).		
G. NUTRIENT MANAGEMENT PLAN (If no NMP, skip this section)			
1.	Does the facility maintain a copy of the nutrient management plan (NMP) onsite?	YES	NO
2.	Date that the NMP (or CNMP) was developed?		
3.	Date that the NMP (or CNMP) was last updated?		
4.	Does the NMP reflect the current operational characteristics (number of animals, cropping, etc.)?	YES	NO
5.	Are the numbers of acres owned/acres leased consistent with those in the NMP?	YES	NO
6.	Is manure and wastewater being applied in accordance with set-back/buffer requirements of the NMP?	YES	NO
7.	Are all of the records identified in the NMP being maintained and kept current?	YES	NO
8.	Are records being maintained at the required frequency?	YES	NO
9.	Are records being maintained onsite for the period required by NMP and/or NPDES permit?	YES	NO

10.	Is the NMP adequately addressing the storage, handling and application of manure and wastewater to prevent discharges to waters of the U.S.?	YES	NO
11.	If you answered NO for any of the questions 1-8, then provide a detailed description of the potential permit violation(s) (optional).		
H. SAMPLING			
1.	Were samples taken during the inspection?	YES	NO
2.	Provide a detailed description of the sampling methods and protocols used, including representative samples, background, holding times, and preservation techniques. (OK to reference the QAPP.)		
3.	Provide a detailed description of where the samples were collected. Include photos and maps of sampling locations. (OK to reference the aerial photo, or logbook where notes on samples were taken.)		
4.	Provide a detailed description of the weather conditions at the time the sample was collected.		
5.	Classify the odors present on-site and locations where malodorous conditions were present. (Scale of 1-10, with 10 being the worst thing you have ever smelled.)		
I. LAND APPLICATION SITES			
1.			

OTHER COMMENTS/NOTES

ATTACHMENTS INCLUDED WITH THIS CHECKLIST

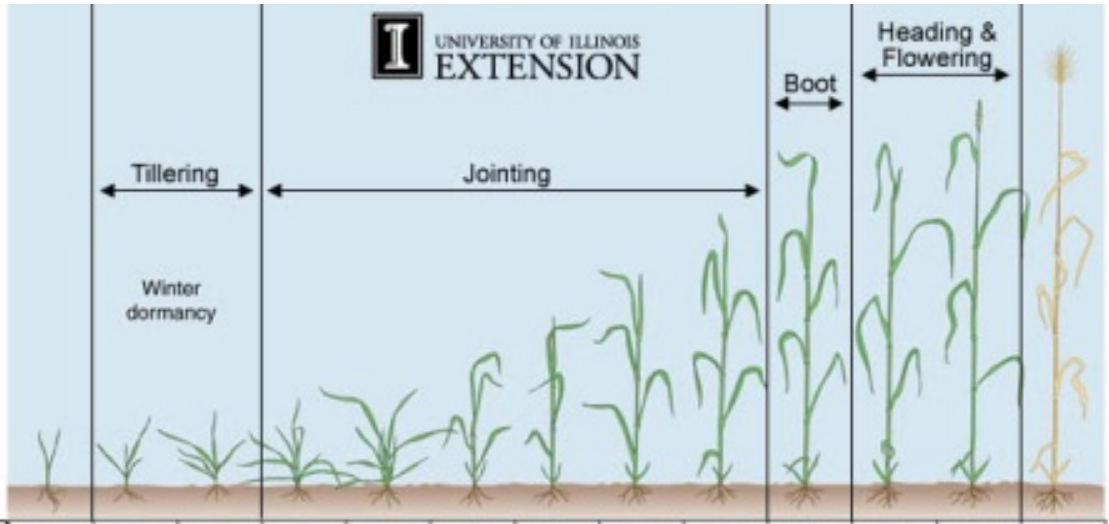
INSPECTORS SIGNATURE AND DATE

SIZE DESIGNATIONS BY ANIMAL TYPE	
LARGE	
DAIRY COWS (Mature, dry or milking)	**700**
CATTLE (Heifers, steers, bulls, and cow/calf pairs)	**1,000**
VEAL CALVES	**1,000**
SWINE (Greater than or equal to 55 pounds)	**2,500**
SWINE (Less than 55 pounds)	**10,000**
HORSES	**500**

SHEEP OR LAMBS	**10,000**
TURKEYS	**55,000**
LAYING HENS OR BROILERS (Liquid manure handling system)	**30,000**
LAYING HENS (Other than liquid manure handling system)	**82,000**
CHICKENS (Other than laying hens and other than liquid manure)	**125,000**
DUCKS (Liquid manure handling system)	**5,000**
DUCKS (Other than liquid manure handling system)	**30,000**
MEDIUM	
DAIRY COWS (Mature, dry or milking)	**200-699**
CATTLE (Heifers, steers, bulls, and cow/calf pairs)	**300-999**
VEAL CALVES	**300-999**
SWINE (Greater than or equal to 55 pounds)	**750-2,499**
SWINE (Less than 55 pounds)	**3,000-9,999**
HORSES	**150-499**
SHEEP OR LAMBS	**3,000-9,999**
TURKEYS	**16,000-54,999**
LAYING HENS OR BROILERS (Liquid manure handling system)	**9,000-29,999**
LAYING HENS (Other than liquid manure handling system)	**25,000-81,999**
CHICKENS (Other than laying hens and other than liquid manure)	**37,500-124,999**
DUCKS (Liquid manure handling system)	**1,500-4,999**
DUCKS (Other than liquid manure handling system)	**10,000-29,999**
SMALL	
DAIRY COWS (Mature, dry or milking)	**<200**
CATTLE (Heifers, steers, bulls, and cow/calf pairs)	**<300**
VEAL CALVES	**<300**
SWINE (Greater than or equal to 55 pounds)	**<750**
SWINE (Less than 55 pounds)	**<3,000**
HORSES	**<150**
SHEEP OR LAMBS	**<3,000**
TURKEYS	**<16,000**
LAYING HENS OR BROILERS (Liquid manure handling system)	**<9,000**
LAYING HENS (Other than liquid manure handling system)	**<25,000**
CHICKENS (Other than laying hens and other than liquid manure)	**<37,500**
DUCKS (Liquid manure handling system)	**<1,500**
DUCKS (Other than liquid manure handling system)	**<10,000**

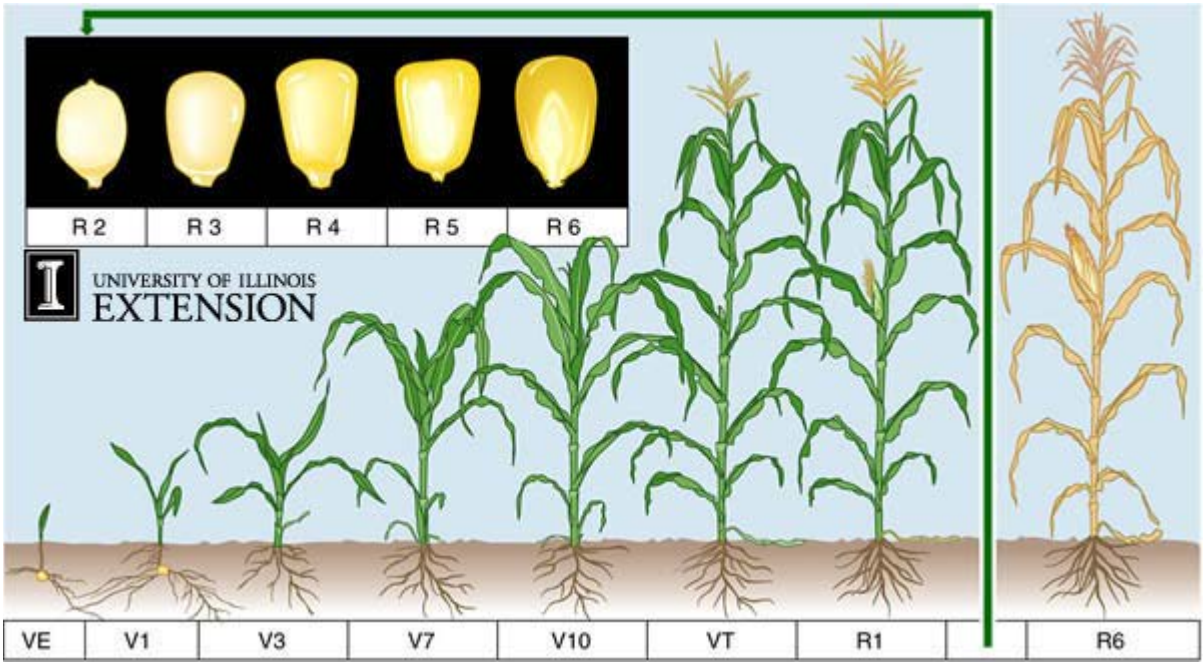
Appendix AK –
Growth Stages of Common Field Crops

GROWTH STAGES OF COMMON FIELD CROPS

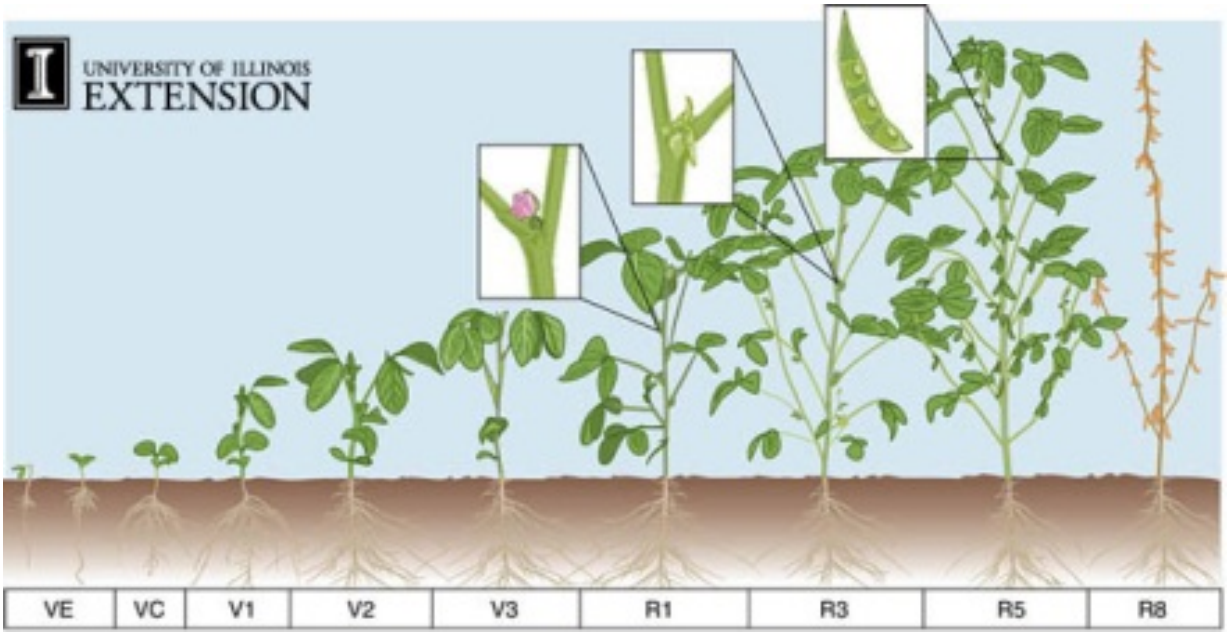


Feekes	1	2	3	4	5	6	7	8	9	10	10.1	10.5	11
Zadoks	10	21	26	30	30	31	32	37	39	45	50	60	90

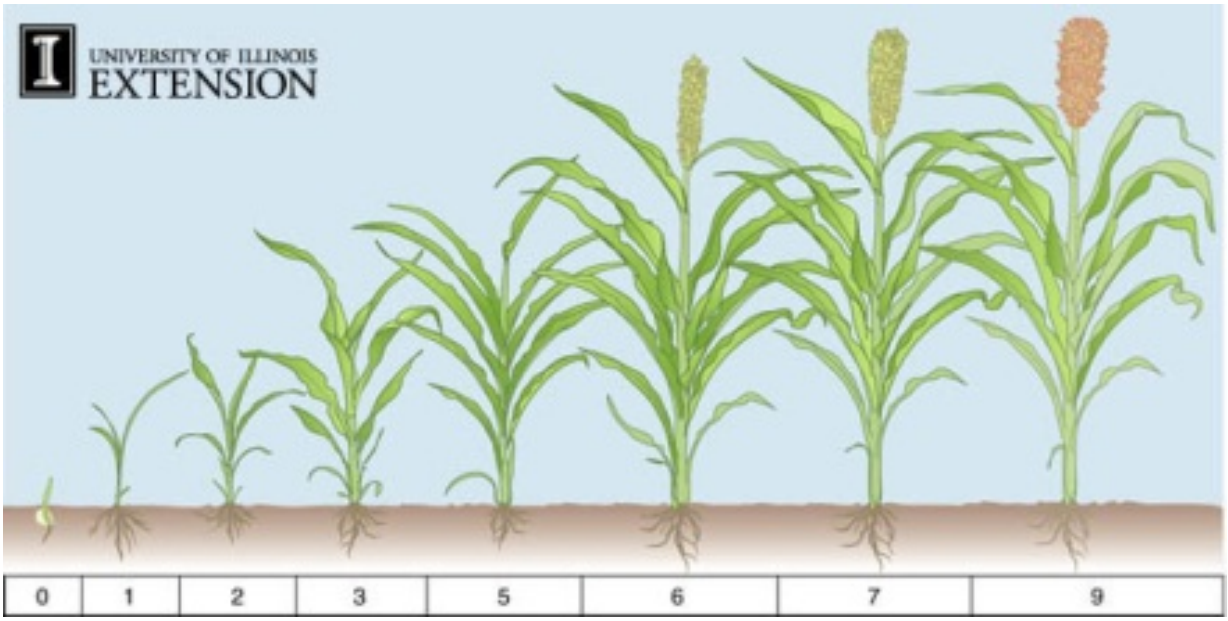
Wheat Source: University of Illinois – Extension



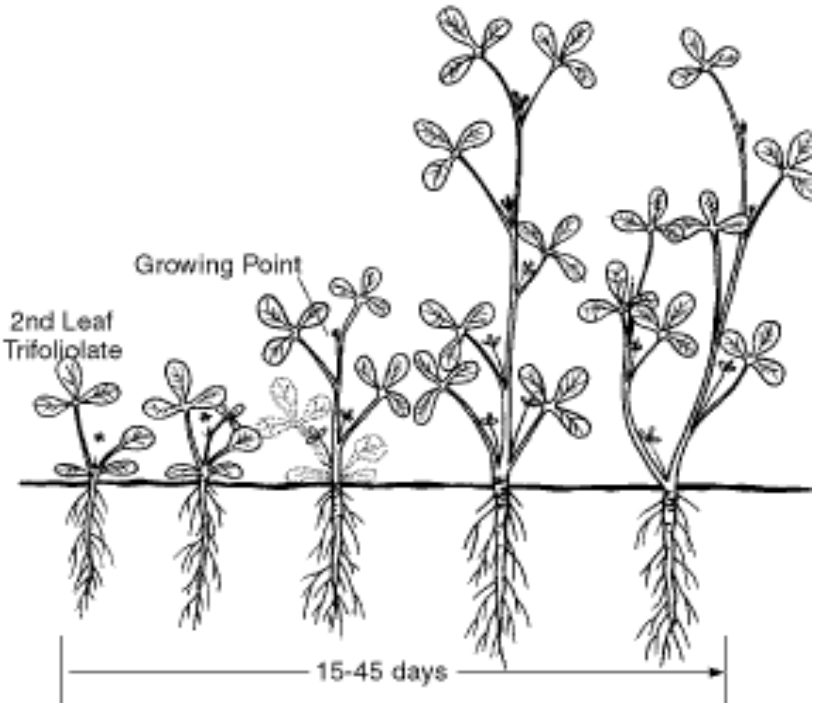
Corn Source: University of Illinois – Extension



Soybean Source: University of Illinois – Extension



Sorghum Source: University of Illinois – Extension



Alfalfa Source: www.ag.ndsu.edu

Appendix AL –
Inspection Introduction Letter

EXAMPLE INSPECTION INTRODUCTION LETTERS

California Regional Water Quality Control Board
Santa Ana Region

Linda S. Adams
Secretary for
Environmental Protection

3737 Main Street, Suite 500, Riverside, California 92501-3348
Phone (951) 782-4130 • FAX (951) 781-6288 • TDD (951) 782-3221
www.waterboards.ca.gov/santaana

Arnold Schwarzenegger
Governor

NOTICE OF INSPECTION
GENERAL WASTE DISCHARGE REQUIREMENTS FOR CONCENTRATED ANIMAL FEEDING OPERATIONS (DAIRIES AND RELATED FACILITIES) WITHIN THE SANTA ANA REGION

August 9, 2007

Dear Dairy Operator:

This letter provides formal notification of the Santa Ana Regional Water Quality Control Board's (Regional Board) intent to conduct an inspection of your facility. [redacted] working under contract with the Regional Board, is authorized to conduct the inspection on behalf of the Regional Board. The purpose of the inspection is to determine the facility's compliance with the Regional Board's Dairy Permit, General Waste Discharge Requirements for Concentrated Animal Feeding Operations, Order No. 99-11, and/or its renewed version (General Dairy Permit).

The information gathered during the inspection may include, but is not limited to; the location and contact information, number and type of animals within the facility, status of development and implementation of the Engineered Waste Management Plan, and the manure/wastewater handling and disposal practices. Digital photographs may be taken and samples may be collected during the inspection. The information gathered will be provided to Regional Board staff for review and will assist us in determining whether the facility is in compliance with the General Dairy Permit. After review of the inspection report, Regional Board staff may contact you for additional information regarding your facility or for necessary follow-up.

We look forward to your cooperation with this matter. Please direct any questions to [redacted] at [redacted].

Sincerely,

[redacted]

[redacted], Chief
Compliance Section

STATE OF COLORADO

John W. Hickenlooper, Governor
Christopher E. Urbina, MD, MPH
Executive Director and Chief Medical Officer

Dedicated to protecting and improving the health and environment of the people of Colorado

4300 Cherry Creek Dr. S.
Denver, Colorado 80246-1530
Phone (303) 692-2000
Located in Glendale, Colorado

Laboratory Services Division
8100 Lowry Blvd.
Denver, Colorado 80230-6928
(303) 692-3090

http://www.cdphe.state.co.us

Colorado Department
of Public Health
and Environment

September 18, 2012

Subject: Notification of Upcoming CAFO Inspection

Dear Concentrated Animal Feeding Operation Operator:

This letter provides formal notification of the Colorado Department of Public Health and Environment's intent to conduct a Concentrated Animal Feeding Operation inspection of this facility. [Insert Name], working under contract for the state, is authorized to conduct the inspection on the department's behalf. The purpose of the inspection is to determine the facility's compliance with Colorado Water Quality Control Commission Regulation No. 81, Animal Feeding Operations Control Regulation (5 CCR 1002-81) and, if applicable, Regulation No. 61, Colorado Discharge Permit System Regulation (5 CCR 1002-61).

The information gathered during the inspection may include the following:

- Facility location and contact information
- Number and type of animals confined
- Information about site characteristics such as manure/wastewater handling and storage facilities and nutrient management practices

Digital photographs may be taken during the inspection. The information gathered will be provided to the department for review. Please be aware that you may be contacted by the department for additional information regarding your facility or for necessary follow-up.

We look forward to your cooperation with this matter. Please direct any questions to me at (xxx) xxx-xxxx, or via e-mail at [insert email address].

Sincerely,

Fax

To:	[Insert Operator]	From:	[Insert Name]
Fax:	[Insert Fax Number]	Pages:	2 (including cover page)
Re:	CAFO Inspection, [DATE]	Date:	[Insert Date]

Dear Mr./Ms. [Name],

Please find attached the Letter of Introduction from [insert name] regarding the Concentrated Animal Feeding Operation (CAFO) inspection scheduled for the facility located at [address] on [Month] [Day], 2012 at [Time AM/PM].

The inspection should last approximately 2 to 3 hours and will consist of a records review and a facility tour. To expedite the records review portion of the inspection, please have available any of the documents and records listed below that you keep for your operation. (Please note that this is not meant to be a list of records that you are required to keep. This is simply a list of the types of records that we would like to review if you do keep them for your operation.)

- Records of third party manure and/or wastewater transfers
- Nutrient management plan (NMP)
- Land application records (for example, nutrient rate recommendations, records of the amounts of manure and/or wastewater or nutrients applied, or records of the dates and fields for each land application event)
- Records of soil, manure, and/or wastewater sampling and analysis
- Facility inspection records (records of inspections that you perform of any impoundments, berms, swales, or other structures used to contain or divert manure and/or wastewater)
- Documentation of:
  - Calculations of the volume of process wastewater runoff generated for each impoundment
  - Drawings of each impoundment
  - Design documentation or calculations of size requirements for stormwater and process wastewater diversion structures.
- Documentation of the terms of the NMP

The facility tour portion of the inspection will focus on manure and/or wastewater handling, storage, and nutrient management practices at your operation.

I look forward to meeting with you [next week].

Sincerely,

Appendix AM –
Sampling Procedures and Equipment

SAMPLING PROCEDURES

CAFO inspectors may be required to collect wastewater, manure, or soil samples during an inspection. Sample collection may be planned in advance or opportunistic. In addition, familiarity with sample collection is useful for determining if the facility followed appropriate procedures for sampling wastewater, manure, and soil. The facility representative may not be familiar with sampling procedures if they are collected by a consultant or extension agent.

Planned sample collection may occur when:

- EPA wants to validate results from soil and manure samples collected by the CAFO for laboratory analysis;
- Surface water or streambed sediment samples are collected as evidence to demonstrate the presence of pollutants discharged from the CAFO; or
- EPA wants to collect samples from standing water in the production area to establish pollutant concentrations.

Opportunistic sampling might occur when a facility is observed to be discharging during the inspection. Regardless, the inspector should be prepared to collect samples. Prior to the inspection, a Quality Assurance Project Plan (QAPP) should be prepared and the inspector should prepare and be familiar with sampling equipment. Sampling, analysis, preservation technique, sample holding time, and sample container requirements are provided in 40 CFR Part 136 as authorized by Section 304(h) of the CWA.

Chapter 5 of the *NPDES Compliance Inspection Manual* is a helpful reference for wastewater sampling/analysis.

Water and wastewater sampling procedures

Typically grab samples will be collected during a CAFO inspection, not composite samples. Grab samples are individual samples collected over a period of time not exceeding 15 minutes and are representative of conditions at the time the sample is collected. The collection of a grab sample is appropriate when a sample is needed to:

- Sample an effluent that does not discharge on a continuous basis
- Provide information about instantaneous concentrations of pollutants at a specific time
- Allow collection of a variable sample volume
- Corroborate composite samples

Some parameters may be sampled only by grab sampling, but others may be sampled by either grab or composite sampling. Parameters not amenable to compositing include pH, temperature, dissolved oxygen, chlorine, purgeable organics, oil and grease, coliform bacteria, and others specified in 40 CFR Part 136. Volatile organics, sulfides, phenols, and phosphorus samples can be composited but require special handling procedures. BOD and ammonia

nitrogen can be sampled by using either grab or composite techniques; if composite sampling is used, appropriate preservation must be provided during and after the sampling period.

Typical parameters sampled at CAFOs are those which readily show an effect on water quality by the discharge. These might include Biochemical Oxygen Demand (BOD), fecal or total coliform bacteria, specific conductance, and ammonia nitrogen. Many other parameters, however, may appropriately be sampled to document such discharges. Sampling of any one or a combination of these parameters can aid the inspector in documenting an illegal discharge.

The volume of samples collected depends on the type and number of analyses needed, as reflected in the parameters to be measured. Obtain the volume of the sample sufficient for all the required analyses plus an additional amount to provide for any split samples or repeat analyses. Consult the laboratory receiving the sample for any specific volume required. In addition, EPA's *Methods for Chemical Analysis of Water and Wastes* (USEPA 1979b) and *Handbook for Sampling and Sample Preservation of Water and Wastewater* (USEPA 1982), and the current Environmental Protection Agency (EPA)-approved edition of *Standard Methods for the Examination of Water and Wastewater* [American Public Health Association (APHA), American Water Works Association (AWWA), and Water Environment Federation (WEF) contain specific recommended minimum sample volumes for different pollutant parameters.

Sample storage and holding times

40 CFR Part 136 describes required sample containers, sample preservation, and sample holding time. It is essential that the sample containers be made of chemically resistant material unaffected by the concentrations of the pollutants measured. In addition, sample containers must have a closure that will protect the sample from contamination. Collect wastewater samples for chemical analysis in plastic (polyethylene) containers. Exceptions to this general rule are organic pollutant samples which are collected in properly cleaned glass jars or bottles and sealed. Collect bacteriological samples in properly sterilized plastic or glass containers.

Ensure sample containers are clean and uncontaminated. Review analytical procedures for specific container cleaning procedures. Use precleaned and sterilized disposable containers when possible. If not, use the following procedures for cleaning sample containers:

- Wash with hot water and detergent.
- Rinse with acid (e.g., nitric for metals).
- Rinse with tap water, then rinse three or more times with organic-free water.
- Rinse glass containers with an interference-free, redistilled solvent (such as acetone or methylene chloride for extractable organics).
- Dry in contaminant-free area.

Table K 1 presents required containers, preservation techniques, and holding times for parameters that might be analyzed in a CAFO water sample.

TABLE K 1. Required containers, preservation techniques, and holding times (EPA 2004)

Parameter	Container	Preservative	Maximum Holding Time
Coliform, fecal and total	Polyethylene or glass	Cool, 4°C 0.008% $Na_2S_2O_3$[5]	6 hours
Ammonia	Polyethylene or glass	Cool, 4°C H_2SO_4 to pH<2	28 days
Dissolved Oxygen Probe Winkler	Glass bottle & top Glass bottle & top	None required Fix onsite and store dark	Analyze immediately 8 hours
Chloride	Polyethylene or glass	None required	28 days
BOD_5	Polyethylene or glass	Cool, 4°C	48 hours
Total phosphorus	Polyethylene or glass	Cool, 4°C H_2SO_4 to pH<2	28 days
Nitrate	Polyethylene or glass	Cool, 4°C	48 hours

Identify each sample accurately and completely. Use labels or tags to identify the samples that are moisture-resistant and able to withstand field conditions. Use a waterproof pen to complete the labels or tags. A numbered label or tag associated with a field sample data sheet containing detailed information on the sample is preferable to using only a label or tag for information. The information for each sample should include the following:

- Facility name/location
- Sample site location
- Sample number
- Name of sample collector
- Date and time of collection
- Indication of grab or composite sample with appropriate time and volume information
- Identification of parameter to be analyzed
- Preservative used.

To ensure the validity of the permit compliance sampling data in court, written records must accurately trace the custody of each sample through all phases of the monitoring program. The primary objective of this chain-of-custody is to create an accurate written record that can be used to trace the possession and handling of the sample from the moment of its collection through its analysis and introduction as evidence.

- Use sample seals to protect the sample's integrity from the time of collection to the time it is opened in the laboratory. The seal should indicate the collector's name, the date and time of sample collection, and sample identification number.

- Pack samples properly to prevent breakage. Seal or lock the shipping container to readily detect any evidence of tampering can be readily detected. Use of tamper proof evidence tape is recommended.
- Place samples on ice or synthetic ice substitute that will maintain sample temperature at 4°C throughout shipment.
- Accompany every sample with a sample tag and a chain-of-custody record that has been completed, signed, and dated. The chain-of-custody record should include the names of sample collectors, sample identification numbers, date and time of sample collection, location of sample collection, and names and signatures of all persons handling the sample in the field and in the laboratory.
- The responsibility for proper packaging, labeling, and transferring of possession of the sample lies with the inspector.
- Accompany all sample shipments with the chain-of-custody record and other pertinent forms. The originator retains a copy of these forms. Also, the originator must retain all receipts associated with the shipment.
- EPA Inspectors with the responsibility of working with hazardous materials that are placed in commerce (transporting/shipping) must have hazardous materials training as required by the Department of Transportation.
- When transferring possession of samples, the transferee must sign and record the date and time on the chain-of-custody record (use the currently approved record). In general, make custody transfers for each sample, although samples may be transferred as a group, if desired. Each person who takes custody must fill in the appropriate section of the chain-of-custody record.
- Pack and ship samples in accordance with applicable International Air Transportation Association (IATA) and/or DOT regulations.

In general, the most common monitoring errors usually are improper sampling methodology, improper preservation, and excessive sample holding time. In addition, the inspector can analyze field blanks to check for analytical artifacts and/or background introduced sampling and analytical procedures.

Field Blanks

Field blanks are distilled or de-ionized water samples prepared when you are collecting water quality samples. Field blanks are prepared, in the field, after cleaning all sampling equipment but before sample collection. Blanks are prepared by pouring distilled de-ionized water into each scoop, dipper, etc. used for sample collection and then into sample bottles as if they were actual field samples. The field blanks are processed and analyzed in an identical manner as the water quality samples. If the lab detects any contamination in the blanks, the sampling results could be considered tainted (either from contamination, errors in sampling, or analysis problems). Collection and analysis of field blanks is not required by federal CAFO regulations; however, field blanks are used for quality control to assess whether contamination was introduced during sampling, and may prove useful in interpretation of results.

Soil sampling procedures

Crop nutrient requirements vary depending on factors such as soil characteristics and previous fertilization. Soil testing is used to provide agronomic and environmentally sound nutrient and lime recommendations. It provides growers a means to assess soil pH and plant-available nutrient content, to determine the need for addition of lime and nutrients, and to minimize nutrient losses to the environment from over-application.

Good animal manure management includes routine soil sampling on every field that manure is applied. EPA generally considers soil sampling for phosphorus every 5 years as the minimum necessary to properly manage soil nutrient levels (as is required for Large dairy, beef, poultry, swine, and veal calf CAFOs under the ELG. 40 CFR Part 412.4(c)(3)).

Proper sampling is the most important component of an accurate soil test. If a representative sample is not collected, the recommendations developed by the laboratory will likely be inaccurate, resulting in excessive nutrient application or deficiencies that will affect production. Permit writers and inspectors will generally not be collecting soil samples, so this section is provided for informational purposes only. However, enforcement actions might require the soil sample collection in some cases.

A soil probe is the most efficient way to collect samples. For facilities applying nutrients at a nitrogen-based rate, collect separate soil samples at depths of 0 to 12 and 12 to 24 inches. Collect soil samples at a depth of 0 to 12 inches only at facilities applying at a phosphorus-based rate.

Every soil sample submitted for testing typically consist of about 15 to 20 cores taken at random locations throughout one field or management unit. The various cores will be used to form one composite sample to be submitted for laboratory analysis. Keep in mind that each composite sample should represent only one general soil type or condition. If the field contains areas that are obviously different in slope, color, drainage, and texture and if those areas can and will be managed separately, a separate sample should be submitted.

Manure sampling procedures

Manure is a variable material requiring proper sampling procedures to ensure collection of a representative sample. Manure samples submitted to a laboratory should represent the average composition of the material that will be applied to the field. For liquid manure, sample directly from the storage structure, from the outlet pipe where liquid is removed, or from the field using catch cans to collect samples applied through sprinklers. A minimum of six separate liquid manure subsamples must be collected. Combine the subsamples in a clean bucket, thoroughly mix, and transfer approximately one pint of liquid to a clean bottle or another rigid container.

For solid manure, remove the surface six-inch crust and use an auger or shovel to core into the pile. Take a minimum of six separate subsamples from around the pile and combine them in a clean bucket. Mix well and transfer approximately one quart to a clean plastic bag. Keep all manure samples cool until delivered to a lab.

It is important that proper containers are used and maximum holding or shipping times are also identified and followed to avoid contaminating or altering the collected samples.

Laboratory identification

The laboratory selected for analysis of surface water or discharge samples may be different from the laboratory selected for analyzing manure and soil samples. Regardless, the laboratory selected should be certified to perform the analyses according to 40 CFR Part 136 methods for water samples and state technical standards for nutrient management for soil and manure samples. Ideally, the laboratory will be able to provide sampling materials at no charge along with sample collection and preparation instructions and mailing labels (if needed).

Regulations at 40 CFR Part 123.36 requires that state technical standards for nutrient management identify acceptable labs or methods for conducting soil and manure analyses. Alternately, NRCS' CPS 590 (NRCS 2011) specifies requirements for selecting laboratories to conduct soil and manure analyses. Soil test analyses must be performed by laboratories successfully meeting the requirements and performance standards of the North American Proficiency Testing Program-Performance Assessment Program (NAPT-PAP) under the auspices of the Soil Science Society of America (SSSA) and NRCS, or other NRCS-approved program that considers laboratory performance and proficiency to assure accuracy of soil test results. Manure testing analyses must be performed by laboratories successfully meeting the requirements and performance standards of the Manure Testing Laboratory Certification program (MTLCP) under the auspices of the Minnesota Department of Agriculture, or other NRCS- approved program that considers laboratory performance and proficiency to assure accurate manure test results.

Data Handling and Reporting

Verified analytical results are normally entered into a laboratory data management system of some type. The system should contain the sampling data, including sampling time and exact location, dates and times, names of analysts, analytical methods or techniques used, and analytical results. Data are then reported to the inspector for inclusion in the compliance report.

Appendix AN –
Sample Quality Assurance Project Plan (QAPP)

SAMPLE QUALITY ASSURANCE PROJECT PLAN (QAPP)

CAFO inspectors may be required to collect wastewater, manure, or soil samples during an inspection. Sample collection may be planned in advance or opportunistic. Opportunistic sampling might occur when a facility is observed to be discharging during the inspection. Regardless, the inspector should be prepared to collect samples. Prior to the inspection, a Quality Assurance Project Plan (QAPP) should be prepared and the inspector should prepare and be familiar with sampling equipment. Below are two QAPP templates for CAFO sampling and analysis.

Sampling, analysis, preservation technique, sample holding time, and sample container requirements are provided in 40 CFR Part 136 as authorized by Section 304(h) of the CWA. Chapter 5 of the *NPDES Compliance Inspection Manual* is a helpful reference for wastewater sampling/analysis.

QUALITY ASSURANCE PROJECT PLAN (QAPP) TEMPLATE

U.S. Environmental Protection Agency
Region

This QAPP template was prepared based on *EPA Requirements for Quality Assurance Project Plans* (EPA QA/R-5), EPA/240/B-01/003, March 2001 (https://www.epa.gov/quality/epa-qar-5-epa-requirements-quality-assurance-project-plans). It contains an outline of the QAPP elements based on the EPA QA/R-5, with an abridged description of the discussion that should be included within each section (included in redline text). This template was created as a tool to assist in development of QAPPs. Users of this QAPP template may consult the EPA QA/R-5 or the more general *Guidance for Quality Assurance Project Plans* (EPA QA/G-5), EPA/240/R-02/009, December 2002 (https://www.epa.gov/quality/guidance-quality-assurance-project-plans-epa-qag-5) as appropriate to obtain additional details and guidance for development of a QAPP.

DRAFT

QUALITY ASSURANCE PROJECT PLAN

<Title of Project (or portion of project addressed by this QAPP)>

Contract/WA/Grant No./Project Identifier

<Enter specific identifier>

Prepared by:

<Enter the contact information including name, affiliation, address, and phone number>

Prepared for:

U.S. Environmental Protection Agency
Region

<Enter date>

SECTION A – PROJECT MANAGEMENT

A.1 Title of Plan and Approval
Quality Assurance Project Plan
<Enter Title of Project>

Prepared by:
<Enter Affiliation>
_____ Date: _____
<Enter name, Organization>, Project Manager / Principal Investigator

Approvals:
_____ Date: _____
<Enter name, Organization>, Quality Assurance Officer
_____ Date: _____
< Enter name, Organization>, Section Chief (Mail Code)
_____ Date: _____
< Enter name, Organization >, Associate Director (Mail Code)
_____ Date: _____
<Enter additional contacts, as needed>

A.2 Table of Contents

<TOC must be regenerated upon completion of QAPP content. To do so, Click in TOC below, select Update Field, then select Update Page Numbers Only>

List of Tables

List of Figures

Appendices

A.3 Distribution List

List the individuals and their organizations that need copies of the approved QA Project Plan and any subsequent revisions, including all persons responsible for implementation (e.g., project managers), the QA managers, and representatives of all groups involved.

<insert text>

Name, Agency/Company, Title, other contact information as needed

A.4 Project/Task Organization

Identify the individuals or organizations participating in the project and discuss their specific roles and responsibilities. Include the principal data users, the decision makers, the project QA manager, and all persons responsible for implementation. Project QA manager position must indicate independence from unit colleting/using data.

Table A.1 Roles & Responsibilities

Individual(s) Assigned:	Responsible for:	Authorized to:
Name	Responsibility	Action
Name	Responsibility	Action

Provide a concise organization chart showing the relationships and the lines of communication among all project participants. The organization chart must also identify any subcontractor relationships relevant to environmental data operations, including laboratories providing analytical services.

Figure A.1 Organization Chart

A.5 Problem Definition/Background

State the specific problem to be solved, decision to be made, or outcome to be achieved. Include sufficient background information to provide a historical, scientific, and regulatory perspective for this particular project.

- Clearly state problem to be resolved, decision to be made, or hypothesis to be tested
- Historical & background information
- Cite applicable technical, regulatory, or program-specific quality standards, criteria, or objectives

<*insert text*>

A.6 Project/Task Description

Provide a summary of all work to be performed, products to be produced, and the schedule for implementation. Provide maps or tables that show or state the geographic locations of field tasks. This discussion need not be lengthy or overly detailed, but should give an overall picture of how the project will resolve the problem or question described in A.5.

- List measurements to be made/data to obtain
- Note special personnel or equipment requirements
- Provide work schedule

<*insert text*>

A.7 Quality Objectives & Criteria

Discuss the quality objectives for the project and the performance criteria to achieve those objectives. EPA requires the use of a systematic planning process to define these quality objectives and performance criteria.

- State project objectives and limits, both qualitatively & quantitatively
- State & characterize measurement quality objectives as to applicable action levels or criteria

<*insert text*>

A.8 Special Training/Certification

Identify and describe any specialized training or certifications needed by personnel in order to successfully complete the project or task. Discuss how such training will be provided and how the necessary skills will be assured and documented.

<*insert text*>

A.9 Documents and Records

Describe the process and responsibilities for ensuring the appropriate project personnel have the most current approved version of the QA Project Plan, including version control, updates, distribution, and disposition.

Itemize the information and records which must be included in the data report package and specify the reporting format for hard copy and any electronic forms. Records can include raw data, data from other sources such as data bases or literature, field logs, sample preparation and analysis logs, instrument printouts, model input and output files, and results of calibration and QC checks.

Identify any other records and documents applicable to the project that will be produced, such as audit reports, interim progress reports, and final reports. Specify the level of detail of the field sampling, laboratory analysis, literature or data base data collection, or modeling documents or records needed to provide a complete description of any difficulties encountered.

Specify or reference all applicable requirements for the final disposition of records and documents, including location and length of retention period.

<*insert text*>

SECTION B – DATA GENERATION & ACQUISITION
B.1 Sampling Process Design (Experimental Design)

Describe the experimental data generation or data collection design for the project, including as appropriate:

- Types and number of samples required
- Sampling network design & rationale for design
- Sampling locations & frequency of sampling
- Sample matrices
- Classification of each measurement parameter as either critical or needed for information only
- Validation study information, for non-standard situations

<*insert text*>

B.2 Sampling Methods

Describe the sampling procedures:

- Identify sample collection procedures.
- Identify sampling methods and equipment
  - Sampling methods by number, date, and regulatory citation, where appropriate
  - Implementation requirements
  - Sample preservation requirements
  - Decontamination procedures
  - Any support facilities needed
- Describe specific performance requirements for the method.
  - Address what to do when a failure in the sampling or measurement system occurs
  - Who is responsible for corrective action
  - How the effectiveness of the corrective action will be determined and documented

<*insert text*>

B.3 Sampling Handling & Custody

Describe the requirements for sample handling and custody in the field, laboratory, and transport. Examples of sample labels, custody forms, and sample custody logs should be included.

<*insert text*>

B.4 Analytical Methods

Identify analytical methods to be followed (with all options) & required equipment.

- Specify any specific method performance criteria
- State requested lab turnaround time
- Provide validation information for non-standard methods
- Identify procedures to follow when failures occur
- Identify individuals responsible for corrective action and appropriate documentation

<*insert text*>

B.5 Quality Control

Identify QC activities needed for each sampling, analysis, or measurement technique. For each required QC activity, list the associated method or procedure, acceptance criteria, and corrective action. State or reference the required control limits for each QC activity and corrective action required when control limits are exceeded and how the effectiveness of the corrective action shall be determined and documented.

Describe or reference the procedures to be used to calculate applicable statistics (e.g., precision, bias, accuracy).

<*insert text*>

B.6 Instrument/Equipment Testing, Inspection, and Maintenance

Describe how inspections and acceptance testing of instruments, equipment, and their components affecting quality will be performed and documented to assure their intended use as specified.

Describe how deficiencies are to be resolved, when re-inspection will be performed, and how the effectiveness of the corrective action shall be determined and documented.

Identify the equipment and/or systems requiring periodic maintenance and/or calibration. Describe how periodic preventative maintenance will be performed, including frequency, to ensure availability and satisfactory performance of the systems. Note availability & location of spare parts.

<*insert text*>

B.7 Instrument/Equipment Calibration and Frequency

Identify all tools, gauges, instruments, and other sampling, measuring, and test equipment used for data generation or collection activities affecting quality that must be controlled and calibrated.

Describe or reference how calibration will be conducted using certified equipment and/or standards with known valid relationships to nationally recognized performance standards. If no such nationally recognized standards exist, document the basis for the calibration.

Indicate how records of calibration will be maintained and be traceable to the equipment.

<*insert text*>

B.8 Inspection/Acceptance of Supplies & Consumables

State acceptance criteria for supplies and consumables and describe how they will be inspected for use in the project. Note responsible individuals.

<*insert text*>

B.9 Data Acquisition Requirements for Non-Direct Measurements

Identify type of data needed from non-measurement sources (e.g., computer data bases and literature files), along with acceptance criteria for their use. Define intended use and describe any limitations of such data.

<*insert text*>

B.10 Data Management

Describe data management process from generation to final use or storage. Describe standard record keeping & data storage and retrieval requirements. Provide examples of any forms or checklists to be used.

Describe data handling equipment & procedures used to process, compile and analyze data (e.g., required computer hardware & software). Describe the process for assuring that applicable information resource management requirements, including EPA specific requirements, are satisfied.

<*insert text*>

SECTION C – ASSESSMENT AND OVERSIGHT

C.1 Assessments and Response Actions

Describe each assessment to be used in the project including the frequency and type (e.g., surveillance, management systems reviews, readiness reviews, technical systems audits, performance evaluations, data quality).

- What is expected information from assessment?
- What are assessment success criteria?
- What is assessment schedule?

Describe response actions to each assessment.

- How will corrective actions be addressed?
- Who is responsible for corrective actions?

How will corrective actions be verified and documented?

<*insert text*>

C.2 Reports to Management

Identify frequency and distribution of reports to inform management of project status:

- Results of performance evaluations & audits
- Results of periodic data quality assessments
- Any significant QA problems

Identify the preparer and recipients of reports, and describe any actions the recipient should take as a result of the report.

<*insert text*>

SECTION D – DATA VALIDATION AND USABILITY

D.1 Data Review, Verification, and Validation

State criteria for accepting, rejecting, or qualifying data; include project-specific calculations or algorithms.

<*insert text*>

D.2 Verification and Validation Methods

Describe the process for data validation and verification. Identify issue resolution procedure and responsible individuals. Identify the method for conveying results to data users. Provide examples of any forms or checklists to be used.

<*insert text*>

D.3 Reconciliation with User Requirements

Describe how the project results will be reconciled with the requirements defined by the data user or decision maker. Outline the proposed methods to analyze the data and determine departures from assumptions established in the planning phase of data collection. Describe how reconciliation with user requirements will be documented, issues will be resolved, and how limitations on the use of the data will be reported to decision makers.

<*insert text*>

GENERIC QUALITY ASSURANCE PROJECT PLAN (QAPP)

FOR

CONCENTRATED ANIMAL FEEDING OPERATIONS (CAFO) INSPECTION SAMPLING

December 2012
Rev 5.0

QAPP APPROVAL:

_____ **Date:**_____
Unit Manager, USEPA

_____ **Date:**_____
Director, USEPA

_____ **Date:**_____
QA Manager, USEPA

TABLE OF CONTENTS

1.0 Project Management Elements

1.1 Distribution List

Copies of the completed/signed project plan should be distributed to:

Name	Title (examples)	Mail Stop	Phone Number	e-Mail Address
	EPA Inspector			
	Regional Sample Control Center (RSCC)			
	QA			
	Supervisor			
	Lab Manager			

Summary of analytical results shall be sent to the EPA Inspector. Electronic copies of data are not required unless specifically requested.

1.2 Project/ Task Organization

This section identifies the personnel involved in CAFO inspection sampling and analytical activities and defines their respective responsibilities in the process.

1. Inspector

The inspector conducts the inspection under the authority provided by the Clean Water Act. The inspector's responsibility is to prepare a final inspection report to be submitted to the immediate program manager based on the results of the inspection conducted and the sample analytical data obtained from the laboratory. In conjunction, the inspector shall also be responsible for:

- Site inspection and recording observations in a note book;
- Documenting the location of site using GPS;
- Conducting dye tracer tests if appropriate;
- Conducting direct readings such as pH, temperature, dissolved oxygen, etc..., if appropriate;
- Collecting water or effluent samples if appropriate;
- Coordinating with the Regional Sample Control Center (RSCC) for regional sample numbers, if appropriate;
- Coordinating with the mobile EPA or commercial laboratory for sample analyses, if appropriate;
- Maintaining sample documentation, including chain of custody, photographs, and receiving sample analytical results.

All of these tasks shall be performed in accordance with the approved QA Plan for CAFO inspections. Changes in procedure should be documented in an appropriate addendum to the plan or sample alteration form included with the site-specific inspection plan.

2. Regional Sample Control Center (RSCC)

The role of RSCC is to coordinate and schedule sample delivery and analysis with the regional laboratory based on the information provided by the inspector in the CAFO Site-Specific Inspection Plan Form (see Appendix A). For sample tracking, the RSCC also provides the inspector with an assigned block of regional sample numbers and the corresponding project code.

3. Quality Assurance Officer (QAO)

The QAO is part of the <insert text> and is located within <insert text>. The QAO is designated and assigned by the Unit Manager and authorized by the Regional QA Manager (RQAM) as his/her designee. The QAO works with the EPA inspectors and ensures that the sample collection and analyses are covered by an approved QAPP that incorporates adequate QA/QC activities to generate data of known and documented quality. The QAO reviews the preliminary CAFO Site-Specific Inspection Plan (see section 1.4.3 of this QAPP) prior to inspection, provide technical comments, if necessary, and ensure that the RSCC coordinates and schedules the analysis of parameters of concern with the applicable analytical methods and associated method performance measures. The QAO may also need to prepare the Statement of Work (SOW) that will be needed for sub-contracting sample analyses by a commercial laboratory.

4. Quality Assurance Officer (QAO)

Samples for biochemical oxygen demand (BOD) or nutrients (nitrogen, phosphorus, potassium) analyses will be done at <insert text> located in <insert text>. Due to short technical holding times, for CAFO inspections, samples for *E. Coli* and fecal coliform are sent to <insert text>. In some cases, samples may need to be shipped to a commercial or State lab. For the CAFO program, the <insert text> lab(s) is/are responsible for the following tasks: provision of "certified clean" sample containers and preservatives, sample analysis, data generation, data reduction and validation, submission of summary of analytical results and/or data print-outs (if requested) for each sample analysis to the inspector and the corresponding QC summary results for precision, accuracy and bias of the values reported.

1.3 Problem Definition/ Background

1.3.1 Background

The Federal and State National Pollutant Discharge Elimination System (NPDES) program monitors and regulates the discharge of pollutants from point sources to waters of the United States. Concentrated Animal Feeding Operations (CAFOs) are point sources, as defined by the CWA [Section 502(14). CAFO means an "animal feeding operation" (AFO) which meets the criteria in 40 CFR Part 122, appendix B, or which the EPA designates as a significant contributor of pollution pursuant to 40 CFR Part 122.23.

The purpose of this Generic Quality Assurance Project Plan (QAPP) is to provide Inspectors from <insert text> with a basic QAPP that will address the project required Data Quality Objectives (DQO) and provide guidelines on sample collection, sample documentation, analytical methods, and data validation and interpretation of data deliverables. This document was prepared in compliance with the EPA Order 5360.1A2 and the EPA QA/G-5 "*Guidance for Quality Assurance Project Plans, EPA/240/R-02/009*".

1.3.2 Objectives/Scope

Determine compliance of CAFO discharges with the Clean Water Act through the collection of samples of opportunity from the facilities inspected.

1.4 Project/ Task Description and Schedule

1.4.1 Project/Task Description

This Generic QAPP is developed for the purpose of supporting announced and unannounced CAFO inspection and sampling activities that may be performed as part of the NPDES program. Samples for coliform determination will be analyzed by <insert text>. The lab must be accredited and /or certified by a recognized accrediting authority such as <insert text>. Samples for other parameters, if needed, will be analyzed by <insert text>. All of the analyses will be performed in accordance with the analytical methodologies and QC requirements specified in Table 3 - Data Quality Objectives Summary of this Generic QAPP. See the sample collection section and specific analyses that will be performed.

1.4.2 Schedule of Tasks

Table 1 – Activity Schedule and Tentative Start and Completion Dates*

Activity	Estimated Start Date	Estimated Completion Date	Comments
Obtain block of numbers from RSCC			
Mobilize to Sites	See CSSIP		
Sample Collection			
Analysis of Samples (on-site or fixed laboratory)			
Data Review & Verification, Reporting to Inspector			
Target Completion Date			

* Note: Most of the inspections are unannounced where the facilities inspected, availability of samples and the parameters of concern are unknown at the time of inspection. The inspectors are allowed to submit the CAFO Site-Specific Inspection QA Plan (last 2 pages of this generic QAPP) within 30 days from the last day of sample collection.

1.4.3 CAFO Site-Specific Inspection Plan (CSSIP)

This CAFO generic QAPP shall cover the QA requirements of all CAFO inspections performed by EPA inspectors within Region <insert text>. After <insert text> approval of this generic QAPP, the inspectors are only required to fill-out the summary of this generic QAPP called the "CAFO Site-Specific Inspection Plan (CSSIP)". The CSSIP is a two-page summary of the sampling, analysis and QA requirements that may be performed during facility inspections. The CSSIP lists the name of facilities inspected, the samples of opportunity that were collected and the chemical and microbiological parameters that were determined by the lab. Table 3 - Data Quality Objectives Summary of this Generic QAPP is also a part of the CSSIP. The inspector(s) check mark the parameters listed in Table 2 applicable to the samples of opportunity collected from the facilities inspected. The draft CSSIP is submitted to the QAO assigned to the project prior to the inspection date for a quick review. A final CSSIP is submitted to the RSCC within 30 days from the last day of sample collection for filing. The first page of CSSIP contains the project, the account code, EPA sample numbers assigned for inspection, list of facilities inspected, address, contact person and phone number, the names of inspectors conducting the inspection and their respective environmental organization affiliations, the total number of samples collected per facility, and the parameters that were determined. The second page of CSSIP is the Table 3 – the Summary of Data Quality Objectives listing the number of samples collected, parameters for analysis, analytical procedures and methodologies and the precision, accuracy and other DQO requirements of the inspection. If applicable, Attachment 1and 2 (Sample Alteration and Corrective Action Forms), may also be included with the CSSIP. The CSSIP is submitted to the QA Office for review and approval before a scheduled sampling event or immediately after collecting samples of opportunity. A blank 2 page CSSIP is attached In Appendix A of this Generic QAPP.

1.5 Data Quality Objectives and Criteria for Measurement Data

Data Quality Objectives (DQOs) are the quantitative and qualitative terms inspectors and project managers use to describe how good the data needs to be in order to meet the project's objectives. DQOs for measurement data (referred to here as data quality indicators) are precision, accuracy, representativeness, completeness, comparability, and measurement range. The overall QA objective for analytical data is to ensure that data of known and acceptable quality are provided. To achieve this goal, data must be reviewed for 1) representativeness, 2) comparability, 3) precision, 4) accuracy (or bias), 5) completeness and 6) sensitivity. Precision, accuracy, sensitivity, completeness, sample representativeness and data comparability are necessary attributes to ensure that analytical data are reliable, scientifically sound, and legally defensible. Each analytical result or set of results generated should be fully defensible in any legal action, whether administrative, civil, or criminal.

Precision: The precision of each test depends on the number of tubes used for the analysis. The method that is used for the CAFO analysis (SM 9221) utilizes a confidence limit of 95 %. Samples in duplicate will be analyzed on a 10 % frequency (1 per 10 samples collected). The precision is evaluated using the Relative Percent Difference (RPD) values between the duplicate sample results.

Accuracy: This is not true relative to microbiology. The method has a detection limit of 1 MPN/100 ml. For other parameters analyzed in the fixed laboratory, accuracy will be evaluated by the use percent recovery (%R) of the target analyte in spiked or QC fortified samples.

$$\% \text{ Recovery} = \frac{SQ - NQ}{S} \times 100$$

SQ = quantity of spike found in sample
NQ = quantity found in native (unspiked) sample
S = quantity of spike or surrogate added to native sample

Representativeness is the degree to which data from the project accurately represent a particular characteristic of the environmental matrix which is being tested. Representativeness of samples is ensured by adherence to standard field sampling protocols and standard laboratory protocols. The design of the sampling scheme and number of samples should provide a representativeness of each matrix or product of the chemical processes being sampled.

Comparability is the measurement of the confidence in comparing the results of one sampling event with the results of another achieved by using the same matrix, sample location, sampling techniques and analytical methodologies.

Completeness: Completeness is the percentage of valid results obtained compared to the total number of samples taken for a parameter. Since sampling from inspections are usually grab and limited in number of samples, the number of valid results obtained from the analyses are expected to be equal or better than 85%. %Completeness may be calculated using the following formula:

$$\% \text{ Completeness} = \frac{\text{\# of valid results}}{\text{\# of samples taken}} \times 100$$

Sensitivity is the capability of a method or instrument to discriminate between measurement responses representing different levels of a parameter of interest. This is most often expressed in terms of method detection limit, instrument detection limit or laboratory quantitation (reporting) limit.

The QA objectives outlined, above, will be evaluated in conjunction with the data validation process.

1.6 Special Training Requirements/Certification

Inspectors are required to complete the 24-hour Basic Health and Safety training. The inspectors will obtain a basic health and safety training certification from the 24-hour training which should be maintained current by attending an 8-hour safety training refresher course every year. The inspectors must also have a signed and current “credential” certifying the

bearer as “Authorized to Conduct Investigations and Inspections Pursuant to All Federal Laws Administered by the United States Environmental Protection Agency”. All of the training courses listed above are provided by EPA Region <insert text>. Furthermore, sampling and sample documentation skills are also assured by the “mentoring” provided by the senior inspectors in the field.

The laboratories performing the sample analysis for this program are SDWA certified and/or accredited. Scientists (Microbiologists/Chemists) performing the analytical work for this project have extensive knowledge, skill and demonstrated experience in the execution of the analytical methods being requested.

1.7 Documentation and Records

Complete documentation for inspections may include but is not limited to the following forms which should be completed and collated by the EPA Inspector:

- Investigation Report
- Records Inspection Checklist
- Chain of Custody Logs
- Record of Sampling
- Laboratory Analysis Reports
- Photographs, Sketches, Paper Copies, Chemical Labels, MSDS, Application Records or other documentation.

Investigators will maintain field notes in a bound notebook and all documents, records, and data collected will be kept in a case file and submitted to the program office with the final inspection report.

The following documents will be archived at *<insert text>* or the designated laboratory performing the analysis: (1) signed hard copies of sampling and chain-of-custody records (2) electronic and hard copy of analytical data including extraction and sample preparation bench sheets, raw data and reduced analytical data.

The laboratory will store all sample receipt, sample login, extraction/preparation, and laboratory instrument print-outs and other analytical documentation as per their established SOP.

2.0 Measurement/ Data Acquisition

2.1 Sampling Process Design (Experimental Design)

Prior to compliance inspections, the EPA Inspector will review and evaluate facility files, if available, which may include facility background information, historical ownership, facility maps depicting general geographic location, property lines, surrounding land uses, a summary of all possible source areas of contamination, a summary of past permits requested and/or received,

any enforcement actions and their subsequent responses and a list of documents and studies prepared for the facility, records and inspection reports from previous compliance site visits.

Based on the data and/or a visual survey of the facility, samples of opportunity on an "as needed" basis will be collected for analysis to characterize the pollutants and determine if they are in compliance with the Clean Water Act.

2.2 Inspection and Sample Collection Procedures

2.2.1 Health and Safety

Inspectors visiting CAFO facilities, need to be aware of and sensitive to bio-security issues and/or procedures related to the potential disease transmission from one facility to another. Facility owners/operators may deny access to a facility because of the existence of a disease or illness at the facility. In addition, there is a real potential that the CAFO inspector may be the vector that transmits a disease from one facility to another if proper precautions are not taken. Minimal recommendations are that visitors to facilities wear freshly laundered clothing and clean footwear, or disposable and easy to clean rubberized rain gear, booties and gloves. EPA inspectors should follow the Agency's Biosecurity guidelines (http://www.epa.gov/agriculture/biosecurity.pdf).

2.2.2 Location

CAFO inspectors should use the Global Positioning System (GPS) for documenting locations of facilities inspected. Upon return, the locational data from each GPS instrument should be differentially corrected by the person issuing the equipment.

2.2.3 Sample Collection

Sample collection methods can vary between standard operating procedures used by samplers and different conditions encountered in the field. The following is general guidance for samplers. Samplers should document in their notes or field checklist the actual method used during sample collection.

If samples are collected manually, rubber gloves should be worn to protect the sampler. Also, the use of safety glasses should be considered. Additional safety information should be covered in a site safety plan or pre-inspection safety briefing.

When a discharge point is identified, the sampler should consider collecting, when possible, samples at a minimum of one collection point. This collection point should be obtained at the discharge point. More sample collection points may be collected by the inspectors if necessary.

When dip samples are taken for coliform analysis, the sampler should carefully remove the cap, ensuring that neither the inside of sample bottle or cap are touched. If possible, hold the cap, do not set it down.

To the extent possible, take the sample by holding the bottle near its base in the hand and plunging it, neck downward, below the surface. Use an extension pole if needed to keep from walking into the effluent stream and stirring up the sampling area. Turn bottle until neck points slightly upward and mouth is directed towards the current. If there is no current, create a

current by pushing bottle forward horizontally in a direction away from the hand. If available, there are special apparatuses that will permit mechanical removal of the cap below the water surface. This can be used to avoid potential contamination of the sample by the sampler.

After collection, carefully recap the sample bottle securely. There should be a 1 inch head space in the neck of the bottle, to allow adequate mixing by the analyst. If, however, the sample container is overfilled, DO NOT pour-out any excess sample. Place the cap back securely on the sample bottle and return to analyst overfilled and a notation will be made in the analyst's report. The sample bottle should be labeled with the date and time of collection, collector's name and sample number, and type of analysis requested. This information should be written on the label using an indelible, waterproof ink. Sample bottle should be placed in plastic bags and stored on ice immediately following collection until they are accepted by the analyst. Proper chain of custody procedures should be followed at all times.

Transfer blank: Each inspector will be provided a single transfer blank for each facility to be inspected and an extra sterile bottle. Half way through the sample collection for each facility, transfer the contents of the full bottle into a sterile bottle. Be careful not to contaminate the inside of the bottle or cap during transfer. Label this bottle with date and time of transfer, name of collector, sample number and label the bottle as a TRANSFER BLANK.

If analysis of additional parameters is needed in a specific case, additional sample containers may be needed. Required sample volume, container type, preservation techniques, and holding times for parameters likely to be sampled are included in (Table 3). Inspectors should use their discretion on which parameters should be used to document violations at a particular facility and are encouraged to discuss this with representatives of the CAFO program.

2.2.4 Sample Collection Equipment

Equipment needs will vary from inspection to inspection. The list in Table 2 provides suggestions to be considered prior to leaving for the field.

Table 2 -Suggested Sample Equipment for CAFO Field Inspections

General	Safety	Emergency
Inspector Credentials Field Notebook Camera Waterproof Pens & Markers Clipboard flashlight Extension Sampling Pole Sample containers Ice Chest Disinfectant Solution (bleach) and Water for boots[1] Extra Set of Coveralls GPS Unit	Water Proof (Rubber) Boots Rain gear Rubber gloves Soap, towels, and water for washing hands Eye protection Hard hat	First Aid Kit Phone numbers Cell Phone

[1] Inspectors/samplers are required to disinfect/decontaminate rubber boots before exiting CAFO facilities to help avoid transmitting animal pathogens from one facility to another. For more information, see Section 2.2.1 Health and Safety and 2.2.7 Decontamination Procedure of this QAPP.

2.2.5 Shipping Requirements

All of the samples are hand-delivered to the laboratory analyzing the samples. Samples for coliform analysis will be hand-delivered to the mobile microbiology laboratory within 6 hours of sample collection. Sufficient ice must be provided to ensure that samples remain cold until received and processed by the laboratory.

2.2.6 Decontamination Procedures

Samples will be collected using clean sampling devices and sample collection gears. Sampling devices and sample collection gear like rain gear, rubber boots and gloves will be cleaned and decontaminated using agricultural-approved disinfectants. Inspectors will follow the proper health and safety procedures when collecting and handling samples to minimize or not to incur contamination.

2.3 Analytical Methods Requirements

Not all parameters will be measured for each CAFO facility inspected. In some cases no samples will be taken at all, and in others, samples may be analyzed for coliform only. In other situations, samplers may be requested to collect additional data such as temperature, pH, turbidity, conductivity, etc. Table 3 -Data Quality Objective Summary lists the parameters that can be measured under this plan, the accuracy, precision, preservative, and holding time requirements.

2.4 Quality Control Requirements

Quality Control procedures for analyte measurements will be according to the requirements specified in the method that will be used in the analysis.

Laboratory instrumentation will be calibrated in accordance with the analytical procedure. Laboratory instrumentation will be maintained in accordance with the instrument manufacturer's specifications and the laboratory Standard Operating procedures (SOPs).

Other Quality Control Measures

- Media, reagents and water - Media and reagent water required for field analysis will be prepared and transported to the field site. QC tests specified for drinking water analysis will be conducted on these supplies prior to being transported. Media will be stored in tightly capped tubes in such a way to prevent formation of air bubbles and adverse environmental effects.
- Incubator and water bath - Temperature will be maintained within specified temperature ranges. Thermometers used for recording temperatures will be calibrated against NIST certified thermometer on a yearly basis. Temperatures will be read and recorded twice daily.

- Refrigerator (if present) - Temperature will be maintained within specified temperature ranges. Thermometers used for recording temperatures will be calibrated against NIST certified thermometer on a yearly basis. Temperatures will be read and recorded twice daily.
- Positive and negative culture controls: Organisms as specified in SM 9020B (Intra-laboratory QC guidelines) will be used on a daily basis to ensure the quality of the media and laboratory equipment has not changed.
- Negative laboratory control: A media sterile check will be done on a daily basis to ensure that no changes in media sterility have occurred.
- Duplicates: Ten percent (10%) of routine samples will be processed in duplicate, or a minimum of one per day that samples are received, whichever is greater. A duplicate sample is performed from the same sample bottle. Samples for microbiological analyses on-site are not required to be preserved.
- Laboratory Temperature: Must be maintained within a few degrees of 35 ºC to ensure incubator temperature consistency. This will be accomplished with the use of thermostatically controlled electric heaters or thermostatically controlled propane forced air heater.
- Sample Disposal: All "spent" growth media will be autoclaved prior to disposal. All unused water samples will be disposed of in a manner that will not result in contamination of the surrounding environment.

2.5 Instrument/Equipment Testing, Inspection and Maintenance Requirements

The laboratory will follow their standard operating procedures for any preventative maintenance required on laboratory instruments or systems used for this project.

2.6 Instrument Calibration and Frequency

Field maintenance and calibration will be performed where appropriate prior to use of the instruments. Calibration of samplers will be performed in accordance with the methodologies used in sample collection and the Instruments Operational Instructions.

The laboratory will follow the calibration procedures found in the methods listed in Table 3 or in the laboratory's SOPs.

2.7 Inspection/Acceptance Requirements for Supplies and Consumables

Sample bottles used for microbial testing will be appropriately cleaned and sterilized. They will be certified clean polypropylene bottles (250 or 500 mL). All sample jars used for chemical analysis in this project will be new and certified clean provided by the laboratory. Investigators will make note of the information on the certificate of analysis that accompanies sample jars to ensure that they meet the specifications and guidance for contaminant free sample containers.

2.8 Data Acquisition Requirements (non-Direct Measurements)

Not Applicable.

2.9 Data Management

A field log notebook, photos, GPS location data and the Field Sample and Chain of Custody Data Sheets will be used to document the sampling and inspection activities. For each sample location, the following will be recorded in the notebook:

- facility name and address
- sample number
- date
- time of each sample collection
- physical description of each sample collection point
- weather conditions
- color
- sample appearance
- sample identifier, and measurements

The Field Sample and Chain of Custody Data Sheets will have the following information:

- site name
- sample number
- date
- time of each sample collection
- sampler's name or initials
- sample location.

If applicable, a suffix l -FD will be appended to the sample identified as the field duplicate. For fixed laboratory analyses, field duplicates will be assigned a separate unique sample identifier and will be submitted 'blind' to the analytical laboratory. Analytical duplicate results will be reported with a trailing -AD (analytical duplicate) or D.

All inspection reports including those for potential enforcement cases will be completed within 30 days of inspection date. Validated laboratory results and interpretation (if necessary) will be appended. Reports will be maintained as enforcement confidential documents until release is approved by the USEPA Office of Regional Counsel (ORC). Photographs and other supporting data along with the inspection report will be used to determine NPDES compliance.

All data generated during this project will be processed, stored, and distributed according to laboratory's SOPs.

3.0 Assessment/Oversight

3.1 Assessments and Response Actions

The EPA Inspector will be responsible for reviewing field log notebooks for accuracy and completeness within 48 hours of each inspection. Sample results provided to the EPA Inspector by the laboratory will be appended to the inspection reports. The EPA Inspector will compare the sample information in the field log notebooks with the analytical results appended to the inspection report to ensure that no transcriptions errors have occurred.

With the exception of the microbiological analyses, RPDs between field duplicate and analytical duplicate measurements will be calculated by the laboratory. RPD's greater than the project requirements will be noted in the associated inspection reports.

Laboratories routinely perform performance checks using different program specific quarterly blind and double blind check standards. Each method of analysis requires specific QA/QC runs that must be complied with by the laboratory performing the analysis. An internal assessment of the data and results are also routinely conducted by the appropriate supervisors and the Laboratory QA Coordinator. No additional audits will be performed on the laboratory for this project.

Corrective action procedures that might be implemented from QA results or detection of unacceptable data will be developed if required and documented in Attachment 2.

3.2 Reports to Management

Only the data validation reports with the properly qualified data shall be provided by the laboratory to the Program Manager and/or Inspectors. If, for any reason, the schedules or procedures above cannot be followed, the EPA Inspector must complete the Attachment 1-Sample Alteration Form (SAF). The SAF should be reviewed and approved by the QAO. The laboratory should be given a copy of the QAO approved SAF for reference and project file.

4.0 Data Validation and Usability

4.1 Data Review, Validation, and Verification Requirements

The criteria for the validation will follow those specified in this QA plan and the criteria specified in the methods.

4.2 Validation and Verification Methods

All data generated shall be validated in accordance with the QA/QC requirements specified in the methods, and the technical specifications outlined in the QAPP. The summary of all analytical results will be reported to the EPA Inspector and the Program Manager. The raw data for this project shall be maintained by the laboratory. Data validation will be performed by the laboratory for all the analyses prior to the release of data. The laboratory will also archive the analytical data into their laboratory data management system.

4.3 Reconciliation with User Requirements

All data and related information obtained during the course of this project will be included in a data report package.

Table 3 - Data Quality Objectives Summary

Analytical Group	Number of Samples[1]	# of Field QA Samples: Dups & Blanks (Bottle/Rinsate/ Lot /Filter)	MS / MSD Samples	Matrix	Method	Method Detection Limits	Accuracy	Precision (RPD)	Complete-ness	Preservation	Volume, Container	Holding Time (days)
Mobile Laboratory Measurements												
Fecal Coliform Mobile Lab or Contract lab		10% dup or 1 per day	NA	Water / sludge	9221C, E	1 MPN/ 100 ml	1 MPN/ 100 ml	varies	95	Cool on ice	Use sample from Fecal Coliform	6 hours[3]
E. Coli Mobile Lab or Contract Lab		10% dup or 1 per day	NA	Water / sludge	9221 F or 9223 DQ	1 MPN / 100 ml	1 MPN / 100 ml	varies	95	Cool on ice	Use sample from Fecal Coliform	6 hours[3]
Fixed Laboratory Measurements												
TKN[4]		10% dup or 1 per day		Water / sludge	351.2	0.2 mg/ L	75-125%	± 20RPD	95	Cool on Ice H_2SO_4 <2	250 mL P, G[6]	28 days
Nitrate-Nitrite		10% dup or 1 per day		Water / sludge	353.2	0.2 mg/ L	75-125%	± 20RPD	95	Cool on Ice H_2SO_4 <2	250 mL P, G[6]	28 days
Total Phosphorus		10% dup or 1 per day		Water / sludge	365.1	0.01 mg/L	75-125%	± 20RPD	95	Cool on Ice H_2SO_4 <2	250 mL P, G[6]	28 days
BOD		10% dup or 1 per day		Water / sludge	5210B	4 mg/L	NA	± 20RPD	95	Cool on Ice	2,500 mL P. G (may use 1 gal cubitainer)	48 hours (receipt at lab by noon on last day of collection)
Potassium		10% dup or 1 per day		Water / sludge	200.7	0.7 mg/ L	75-125%	± 20RPD	95	Cool on Ice HNO_3 <2[5]	250 mL P, G	180 days

Table 3 - Data Quality Objectives Summary

Analytical Group	Number of Samples[1]	# of Field QA Samples: Dups & Blanks (Bottle/Rinsate/ Lot /Filter)	MS / MSD Samples	Matrix	Method	Method Detection Limits	Accuracy	Precision (RPD)	Complete-ness	Preservation	Volume, Container	Holding Time (days)
Field Measurements (optional - water samples only)												
Dissolved Oxygen		10% dup or 1 per day		Water	360.1	0.1 mg/L	0.2 mg/L	± 20 RPD	100	Not Required	500 ml G	Analyze Immediately
Turbidity Mobile Lab		10% dup or 1 per day		Water	180.1	0.1 NTU	0.5 NTU	± 20 RPD	100	Cool on Ice	100 mL	48 hours
pH		10% dup or 1 per day		Water	150.1	0.1 pH Units	0.1 pH Units	± 0.2 pH Units	100	Not Required	100 ml P, G	Analyze Immediately
Temperature		10% dup or 1 per day		Water	2250B	0.1 ºC	0.3 ºC	± 20 RPD	100	Not Required	Not Required	Analyze Immediately

1 - Sample number includes QA samples and Matrix Spike / Matrix Spike Duplicate (MS/MSD) samples listed in the next two columns. P, G - Plastic, Glass.

[2] - Sodium thiosulfate

[3] - Non-potable water samples have a 6 hour holding time from the time of sample collection until receipt at the laboratory. Additional 2 hours holding time are allowed from the verified time of sample receipt in the lab until the samples are seeded into an inoculation broth.

[4] - Total Kjeldahl Nitrogen

[5] –Due to shipping restrictions on nitric acid, preservation for potassium may be performed at the lab and the sample held for 18-24 hours prior to sub-sampling.

[6]- Samples for NO_3+NO_2, TKN, and Total Phosphorus may be combined in one sample container however the required volume increases. Use a 1L P,G bottle if combining nutrients.

Attachment 1-Sample Alteration Form

Project Name and Number: _____
Sample Matrix: _____
Measurement Parameter: _____

Standard Procedure for Field Collection & Laboratory Analysis (cite reference):
_____
_____

Reason for Change in Field Procedure or Analysis Variation:
_____
_____

Variation from Field or Analytical Procedure:
_____
_____

Special Equipment, Materials or Personnel Required:
_____
_____
_____
_____

Initiators Name: _____ Date: _____

Project Officer: _____ Date: _____

Quality Staff: _____ Date: _____

Attachment 2-Corrective Action Form

Project Name and Number: _____

Sample Dates Involved: _____

Measurement Parameter: _____

Acceptable Data Range: _____

Problem Areas Requiring Corrective Action: _____
_____
_____
_____

Measures Required to Correct Problem(s): _____
_____
_____
_____

Means of Detecting Problems and Verifying Correction: _____
_____
_____
_____

Initiators Name: _____ Date: _____

Project Officer: _____ Date: _____

Quality Staff: _____ Date: _____

CAFO Inspection Generic QAPP
Appendix A: Site-Specific Inspection Plan (CSSIP)

This CSSIP will be prepared and used in conjunction with the Generic CAFO QAPP for collecting samples of opportunity during announced and unannounced inspections. Please refer to the Generic QAPP for specific details regarding CSSIP.

Project Code(s)	Sample Numbers	EPA Inspectors/Phone Numbers/Mail Stop
(As noted below)	(Assigned in blocks of 50 sample IDs per Project Code)	

COOPERATING AGENCIES/PARTIES INVOLVED:

Contact Person	Agency	Phone

LIST OF FACILITIES INSPECTED:

Facility Name	Assigned Project Code	Address	Contact person	E-mail/phone Number	# Samples Collected*

*Samples Collected is an estimate prior to the inspection and will be submitted in final form after the inspection is complete.

Parameter(s) to be tested (should match entries on DQO Table):

_____

TENTATIVE PROJECT SCHEDULE:

Activity	Est. Start Date	Est. Completion Date	Comments
Mobilize to Site			
Sample Collection			
Laboratory Receipt of Samples			
Target Completion Date			

DATA DISTRIBUTION:

Name and Mail Stop	Electronic	Hard Copy

Concurrence with the CSSIP:

QA Chemist: _____ Date: _____
Name and Signature

Inspector: _____ Date: _____
Name and Signature

Instructions

<Insert Region specific instructions>

CSSIP Page 2 - Table of Data Quality Objectives Summary

Analytical Group	Number of Samples[1]	# of Field QA Samples: Dups & Blanks (Bottle/Rinsate/ Lot /Filter)	MS / MSD Samples	Matrix	Method	Method Detection Limits	Accuracy	Precision (RPD)	Completeness	Preservation	Volume, Container	Holding Time (days)
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BOD		10% dup or 1 per day		Water / sludge	5210 B	4 mg/L	NA	± 20RPD	95	Cool on Ice	2,500 mL P. G (may use 1 gal cubitainer)	48 hours (receipt at lab by noon on last day of collection)
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Temperature		10% dup or 1 per day		Water	2250 B	0.1 ºC	0.3 ºC	± 20 RPD	100	Not Required	Not Required	Analyze Immediately

1 - Sample number includes QA samples and Matrix Spike / Matrix Spike Duplicate (MS/MSD) samples listed in the next two columns. P, G - Plastic, Glass.

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[5] –Due to shipping restrictions on nitric acid, preservation for potassium may be performed at the lab and the sample held for 18-24 hours prior to sub-sampling.

[6]- Samples for NO_3+NO_2, TKN, and Total Phosphorus may be combined in one sample container however the required volume increases. Use a 1L P,G bottle if combining nutrients.

Appendix AO – Detailed Review of Nutrient Management Plan Implementation

DETAILED ANALYSIS OF NMP IMPLEMENTATION

Evaluation of the calculations and records associated with the NMP typically will focus on the site-specific terms of the NMP that have been incorporated as conditions of the CAFO's permit. NMP review of the land application elements will focus on the nutrient transport risk assessment, rate calculations, and land application records.

When evaluating the land application requirements of the NMP, use the elements in Table 1 to help identify potential compliance alerts and clarification questions to ask the facility.

Table 1: NMP Land Application Records and Recordkeeping Expectations

NMP Records to be Reviewed	Expectation for What Will be Recorded
How much manure does the CAFO generate each year?	This information is used to determine if the CAFO has adequate storage and land application fields or if manure must be transferred off-site.
If the CAFO does not land apply manure, can they produce manure transfer records to account for disposal of all manure?	Manure transfer records should account for all manure generated. The CAFO must also have manure test results provided to each manure hauler.
How many land application fields under the CAFO's control are used and what is the total acreage?	Amount of manure land applied divided by available acreage approximates the weight of manure applied per acre.
Does every acre receive manure every year or are the fields rotated? If rotated, does the CAFO have a quantitative approach to determine which fields receive manure each year?	If the CAFO is relying on multiyear phosphorus application,[35] they must be able to demonstrate that they are not over applying in frequency or amount.
Are setbacks or buffers from down gradient surface waters documented and implemented?	The CAFO representative will need to identify which fields have buffers or setbacks and show at least one of these to the inspector.
Do NMP records account for all forms of manure present at the CAFO (solid, slurry, and liquid)?	If the CAFOs sampling is representative, nutrient application will be based on sample results from all forms of manure. Otherwise, the CAFO may over- or under-apply as a result of not accounting for nutrients in all manure forms.
Does the CAFO have recent sampling and analysis records for all manure sources?	Nutrient application rates must be based on the most recent manure nutrient results. If manure nutrient content changes significantly from values used in the nutrient

[35] For a discussion of multiyear phosphorus application refer to section 6.3 of EPA's *Permit Writers' Manual for CAFOs* (February 2012).

NMP Records to be Reviewed	Expectation for What Will be Recorded
	management plan, the nutrient management plan should be updated to reflect the new values.
Does the CAFO have recent soil sampling and analysis records, P risk assessments, and rate calculations for all fields currently receiving or scheduled to receive manure?	Non-recent of these may not reflect current conditions and result in over- or under-application of nutrients and potential environmental harm from offsite transport of phosphorus in runoff.
What crops are planted or planned for nutrient application fields and what are the nutrient uptake rates for these crops?	Different crops have different nutrient uptake rates and timing considerations for nutrient applications. The CAFO should base application rate calculation on book value nutrient uptake rates specific to the state or region, or actual uptake rates based on recent plant tissue samples. In the latter case, the CAFO should provide laboratory reports in support of the results. The inspector should field-verify the crops being grown in one or more land application fields. Appendix I contains photos of the growth stages of common field crops.

Nutrient Application Rate Calculations

For permitted CAFOs, the permit writer will have already ensured that the methodology used to calculate rates in the NMP is consistent with the permit and applicable technical standards. The inspector's job is to verify that the actual manure application rates are being calculated in accordance with the NMP methodology. This determination will depend on whether the NMP terms were developed in accordance with the linear or narrative rate approach as discussed below.

Terms Applicable to Linear and Narrative Rate Approaches
Fields Available for Land Application

The NMP will identify each field where land application is planned. The inspector should compare the land application records with the fields identified in the NMP to ensure manure, litter, or process wastewater were not applied to fields that are not covered by the plan. Use of a land application site that is not identified in the NMP constitutes non-compliance with a permit term. Also, addition of a land application site not covered by an approved NMP constitutes a substantial change to the NMP that requires a permit modification with associated permitting authority review and public notice.

Timing Limitations for Land Application

As described in Chapter 6.5.1 of the *Permit Writers' Manual for CAFOs* this term refers to limitations described in the technical standards for when manure applications should be prohibited or delayed. The inspector should check land application records to see if the applicable timing limitations are being followed. In some cases this will be a straight-forward evaluation. Often, however, evaluating compliance will require the inspector and case officer to use professional judgment and diverse resources, as illustrated by the examples below.

Document Review Tip: Spot check records for a single field

- ✓ Does the CAFO have current soil and manure test results for the field and source of manure applied?
- ✓ Are the calculations for planned manure application rates consistent with the NMP methodology?
- ✓ Are actual manure application rates consistent with calculated rates?
- ✓ Are the total nutrient applications (from manure and other sources) consistent with crop nutrient recommendations?
- ✓ Did the CAFO perform a phosphorus index risk assessment for the field?
- ✓ Is the CAFO applying phosphorus at a rate consistent with the phosphorus transport risk assessment?
- ✓ Was manure applied on the same day as, or the day before, a significant rain event?

It is usually easiest and least expensive for a CAFO to apply manure to the field nearest the manure

EXAMPLE COMPLIANCE EVALUATION FOR TIMING LIMITATIONS

Example Timing Limitation

Manure shall not be spread between December 1 and March 15.

Compliance Evaluation

Check land application dates to ensure manure has not been spread during the restricted time frame.

Example Timing Limitation

Delay field application of animal manures or organic by-products if precipitation capable of producing runoff and erosion is forecast within 24 hours of the time of the planned application.

Compliance Evaluation

Compare land application dates with local precipitation records. If precipitation occurred within a day of land application, additional evaluation may be warranted to determine whether:

1) The precipitation was capable of producing runoff and erosion. In some cases this may be determined using on-site records, though these types of records are not common. Several modeling tools are available to predict soil erosion based on precipitation events and field conditions including, but not limited to:

- Water Erosion Prediction Project (WEPP) Model (http://www.ars.usda.gov/Research/docs.htm?docid=10621)
- CREAMS, A field scale model for Chemicals, Runoff, and Erosion from Agricultural Management Systems
- Areal Nonpoint Source Watershed Environment Response Simulator (ANSWERS)

- AGNPS model (http://go.usa.gov/KFO)

2) The precipitation was forecast at the time of application. There are many sources of historical weather information; unfortunately, historical weather forecasts are more difficult to obtain. If local newspaper archives are available, these may be a resource for determining the forecast for a specific date.

If these two pieces of information can be determined, the inspector and case officer then would have to use professional judgment to deduce whether the CAFO operator should reasonably have been aware that precipitation capable of producing runoff and erosion was forecast within 24 hours at the time the manure was applied. Because the analysis is resource-intensive and somewhat subjective, retrospective compliance determination for this type of timing limitation may not be practical. If an inspector is concerned that the CAFO operator may be applying manure without consideration for timing limitations, real-time monitoring might be a better method for evaluating compliance. Records obtained during an on-site inspection can be used to predict typical application schedules for a particular operation. It may be beneficial to conduct drive-by inspections during these time frames when significant rainfall is predicted to determine whether land application is occurring.

Example Timing Limitation

Wastewater shall not be applied when the ground is frozen or saturated or during rainfall events.

Compliance Evaluation

Determining whether manure or wastewater was applied during rainfall events is relatively straightforward but may require some judgment or interpretation. The inspector can compare land application dates with local precipitation records. CAFOs often maintain daily precipitation logs. Alternatively, Internet resources such as The Weather Underground (www.weatherunderground.com) and Utah Climate Center (http://climate.usurf.usu.edu/products/data.php) can be used to determine whether a rainfall event occurred, at least at a nearby weather station, on a specific date. Unless the data document the time of application and precipitation, it might not be possible to positively determine whether the two events were concurrent, but the inspector and case officer can use information such as the magnitude of the rainfall, whether rainfall occurred on the previous and/or subsequent days, the amount of manure or wastewater applied, and other circumstantial data to assess the likelihood that manure or wastewater was applied during a rainfall event.

Evaluating whether wastewater was applied on frozen or saturated ground is more complex. Many variables such as season, latitude, altitude, proximity of lakes and rivers, and local landscape, can affect when soils freeze and thaw. To predict soil saturation the inspector and case officer would need information on soil types including antecedent soil moisture, hydraulic conductivity, infiltration rate, and precipitation and irrigation history. Here again, the evaluation is time-consuming and because it is not based on direct observation may not result in a positive determination of non-compliance. If the land application records for a facility

suggest the CAFO operator is applying wastewater to frozen or snow-covered ground, it may be more effective for an inspector to visit CAFOs under those conditions to observe whether land application is occurring.

Outcome of the Field-Specific Assessment of the Potential for Nitrogen and Phosphorus Transport from Each Field

The inspector should ensure the calculated land application rates are consistent with the rate recommendation from the technical standards based on the outcome of the risk assessment.

Some states require CAFOs to use a nitrogen leaching index or other tool to assess the risk of nitrogen movement to groundwater. Where such a tool is required and strictly focuses on groundwater protection, use of the tool is not a federally enforceable requirement under the NPDES program. However, where there is a direct hydrologic link from groundwater to surface waters and a nitrogen leaching risk assessment is required as part of the technical standards for nutrient management, the inspector should check to ensure that any rate limitations or management practice specifications associated with the outcome of the leaching index are being implemented.

CAFO inspectors should be familiar with the phosphorus risk assessment tool required by the applicable technical standards for nutrient management. Often, this will be the state's Phosphorus Index (P Index), but could also be a soil test phosphorus method, a phosphorus environmental threshold, or other similar assessment tool. Where the risk assessment for a field indicates that manure application should be restricted to a phosphorus-based rate, any application exceeding that rate is inappropriate unless the state allows multi-year phosphorus application. Where rates are P-limited and multi-year P applications are made, the inspector should review the land application records to ensure the applications are consistent with all restrictions associated with the multi-year P flexibility (e.g., no additional P applied until the P applied in single year has been removed through uptake and harvest, the total multi-year rate does not exceed the single-year N recommendation, location or timing restrictions).

The inspector should also check to see that the risk assessment rating is being re-calculated at appropriate intervals. Some state technical standards may specify re-calculation at a specific frequency or based on specific triggers. Even if the permit or technical standards do not specifically require re-calculation of the risk assessment outcome, the inspector should be aware of circumstances under which a field should be re-assessed. These circumstances will depend on the specific risk assessment used. In general, where there is a change in any of the factors used in calculating the risk of nutrient transport, the risk should be re-assessed. For example, many P Indices account for the conservation practices implemented on a field when evaluating the risk of nutrient transport from that field. If the CAFO operator changes the conservation practices used on a field, then the P Index for that field should be re-calculated. Any change to a field that might reasonably result in an increase in the nutrient transport risk could be considered a trigger for recalculating that field's risk assessment.

In states that allow use of more than one type of phosphorus risk assessment, the inspector should check to be sure that the assessment tool used in the NMP submitted with the application for permit coverage is used throughout the permit term. A CAFO may not switch to

a different risk assessment method during the permit term unless the permit is revised to reflect the new term for the outcome of the field specific assessment, as this would trigger a substantial permit modification. See Chapter 4.1.7 of the *NPDES Permit Writers' Manual for CAFOs* (EPA, 2012a).

The examples below illustrate compliance evaluations for the most common types of risk assessment tools:

Example: Nitrogen Leaching Index Outcome

Net Score: 13

Risk Interpretation: This field has a HIGH risk for nitrogen leaching and management changes should be implemented to decrease risk. Manure should be applied at P agronomic rates. Apply nitrogen using split in-season applications at or below the agronomic rate. Changes in irrigation management and/or method may also be necessary. If there is an underlying aquifer that is shallow (< 20 ft.) or used locally as a public drinking water source, increase the risk to VERY HIGH. [Colorado NRCS. 2006, Colorado Nitrogen Leaching Index Risk Assessment (Version 2.0). Agronomy Technical Note No. 97 (revised), August 25, 2006. <http://efotg.sc.egov.usda.gov/references/public/CO/COATN_97v2.pdf >)

Compliance Evaluation

Terms like "should" and "may be necessary" complicate compliance evaluation for this type of requirement. The inspector and case officer will need to use professional judgment to determine what practices, including phosphorus-based rates and irrigation management changes, the CAFO operator should reasonably be expected to implement. In this case, split in-season nitrogen application is required; the inspector should review the NMP and land application records to ensure that this practice is used. If inorganic nitrogen sources (e.g., anhydrous ammonia, urea) are used, the inspector should keep in mind that the entire manure nitrogen contribution may be applied at one time. Local recommendations for practices like split nitrogen application can be used as guidelines for evaluating compliance if the practices are not covered in the technical standards for nutrient management; Land Grant Universities are good sources for recommendations on agricultural practices.

Example: Soil Test Phosphorus Level

Soil test phosphorus level (Bray P1/Mehlich 3 ppm): 63 ppm

Basis for nutrient application: Not to exceed 1.5 x crop P_2O_5 removal [Indiana NRCS. 2001. Conservation Practice Standard, Nutrient Management, Code 590. Indiana Natural Resources Conservation Service Field Office Technical Guide—July 2001.]

Compliance Evaluation

The inspector should verify that the soil test phosphorus result used to determine the basis for nutrient application is current and based on the appropriate extraction method. Next, the inspector should evaluate the calculated land application rates to verify that the planned application does not exceed 1.5 times the crop P_2O_5 removal rate.

Example: Soil Phosphorus Threshold Level

Soil test phosphorus threshold: 40 ppm (Olsen), 60 ppm (Bray-1), 6 ppm (Morgan)

Soil test phosphorus level: 50 ppm (Olsen)

Phosphorus application rate: Crop rotational phosphorus uptake [Idaho NRCS. 2007. Conservation Practice Standard, Nutrient Management, Code 590. Idaho Natural Resources Conservation Service Field Office Technical Guide—June 2007.]

Compliance Evaluation

The inspector should verify that the soil test phosphorus result used to determine the basis for nutrient application is current and based on the appropriate extraction method. Next, the inspector should check the calculated land application rates to verify that the planned application does not exceed the crop phosphorus uptake rate.

A Note on Phosphorus Recommendations

The inspector should be aware of differences between the several types of phosphorus recommendations that may be seen.

- Soil test phosphorus recommendation: A recommendation for the amount of additional phosphorus needed in the soil to ensure an optimal level of phosphorus to support achievement of maximum potential crop yield.
- Phosphorus crop uptake: The amount of phosphorus a crop will take up from the soil during its life cycle.
- Phosphorus crop removal: The amount of phosphorus that will be removed from the field through crop uptake and harvest. This amount may be less than the phosphorus crop uptake amount since a portion of the plant may remain in the field after harvest and the nutrients in the crop residue returned to the soil.

Example: Phosphorus Index

Phosphorus index value and risk rating: 12, Medium risk

Recommended rate basis: Nitrogen-based application

Compliance Evaluation

If not already done during the permitting process, the inspector should review the factors used to calculate the P Index value to ensure the values appear to reasonably reflect site conditions. Those factors might include soil erosion, runoff class, soil test phosphorus, phosphorus application rates, and conservation practices. Factors like soil test phosphorus, application rates, and conservation practices can be checked against facility records. Others, like runoff class or other soil properties, can be checked against soil surveys (available through NRCS's Web Soil Survey: http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm). Soil erosion is usually calculated using the Revised Universal Soil Loss Equation, version 1 (RUSLE2). RUSLE2 is a computer model that uses a detailed mathematical approach for integrating multiple equations that describe how certain factors affect soil erosion. Appendix A of the *NPDES Permit Writers' Guide for CAFOs* contains a detailed discussion of RUSLE2. The inspector also should evaluate calculated land application rates to ensure that the planned nitrogen application does not exceed the recommendation.

Planned Crop or Other Use

The rate calculations in the NMP are based on the crop or crop rotation planned for each field. The inspector should evaluate land application records to ensure the crops actually grown in the field are the same as the crops that were planned for that field during that year. The only exception would be for the use of alternative crops included in the NMP, which is discussed below as a term for the narrative rate approach.

A Note on Yield Goals
The inspector should check on-site records, where available, to ensure that actual yields are consistent with the yield goals used in the NMP.

Total Nitrogen and Phosphorus Recommendations for Each Crop

During the permitting process, the permit writer will evaluate these recommendations to ensure they are consistent with the planned crops and yields in accordance with the technical standards for nutrient management. For the total nitrogen recommendation and phosphorus recommendations based on crop uptake or removal, this permitting evaluation is adequate. For a total phosphorus recommendation that is based on soil test phosphorus levels, the inspector can check the facility records for the soil phosphorus analysis used as the basis for the recommendation included in the NMP. Specifically, the inspector can check to see if the analysis uses the appropriate extraction method as specified in the technical standard for nutrient management, that the soil sample was taken at the correct depth (see S*oil Sampling* in Chapter 5.9.2 of the *NPDES Permit Writers' Manual for CAFOs* (EPA, 2012a)), and that the analysis reports phosphorus in the same form as used in the soil test recommendation. Phosphorus is commonly reported as either elemental phosphorus (or total P) or phosphorus pentoxide (P_2O_5). Total P can be converted to P_2O_5 as follows: $P_2O_5 = P \times 2.29$.

Realistic Annual Yield Goals

The realistic yield goal is an estimated potential for crop yield for a given field. The total nutrient requirements for fields are largely based on the CAFOs expected crop yields; generally, the higher the yield expectation, the higher the nutrient requirement. An unrealistic estimate can result in either a deficiency or an excess of nutrients being applied. In addition to crop variety and climate, crop yields are influenced by field-specific factors including, among others, soil fertility, soil type, crop management and pest control. Thus, estimated yields can be expected to vary for different fields. State technical standards for nutrient management need to identify acceptable methods and data sources for establishing realistic yield goals. One way to establish realistic yield goals is to use the average of the three highest yields of the five most recent years that the specific crop was grown in the field. For new operations where production records are not available, CAFOs may need to use information available through county NRCS field offices or from local farmers.

Terms Applicable to the Linear Approach
Credits for Plant Available Nitrogen in the Field

Under the linear approach, the credits from the nitrogen that will be available to the crop from all other sources are terms. These other sources include nitrogen credits from mineralization and legumes.

Nitrogen credits are a term even for a field with a phosphorus-based rate because the nitrogen credit is needed to calculate the appropriate amount of supplemental nitrogen to be added to the field to ensure that the crop's nitrogen requirement is not exceeded.

Consideration of Multi-Year Phosphorus Application

Where a phosphorus-based rate is required, technical standards for nutrient management might allow several years' worth of phosphorus to be applied in a single application. For an NMP that includes multi-year phosphorus application, the permit term will identify the field, crop, and year for the application. Where allowed, a multi-year phosphorus application should not exceed the nitrogen recommendation for the year of the application, and no additional phosphorus should be applied until the amount supplied in the multi-year application is removed through crop uptake and harvest. Technical standards for nutrient management might include additional restrictions or requirements for where or when such applications are allowed and what practices must be implemented to reduce the risk of nutrient loss from a multi-year phosphorus application. The inspector should evaluate land application records to verify that multi-year applications did not occur during any year or on any field or crop not identified in the NMP. For any field where a multi-year application was used, the inspector should also determine the number of years covered by the application and check to see that phosphorus was removed during the subsequent years through harvest as specified in the NMP and that no additional phosphorus was applied for the number of years covered by the multi-year application. In addition, the inspector should check for implementation of any specifications for multi-year in the permit or technical standards for nutrient management.

For example, Illinois' General NPDES Permit for Concentrated Animal Feeding Operations (Permit No. ILA01) requires site-specific practices, determined through assessment procedures to be specified in the NMP, to minimize runoff of P applied to land in a multi-year P application. For a permitted CAFO in Illinois, the inspector should first determine that the assessment procedures specified in the NMP were followed and ascertain the practices that were identified as a result of the assessment. Then the inspector should check to see if those practices were implemented to minimize phosphorus runoff from the multi-year phosphorus application.

Accounting for All Other Additions of Plant Available Nitrogen and Phosphorus

As described in the *NPDES Permit Writers' Manual for CAFOs* (EPA, 2012a), this term captures all non-manure nutrient sources (e.g., chemical fertilizers, biosolids, and nutrients in irrigation water). The permit term will identify the "other additions" that are planned for each field and crop for each year of permit coverage. The inspector should evaluate land application records to see if only the nutrient sources identified in the NMP were actually applied to the field. It is important to note that the term does not obligate the CAFO operator to use a specific nutrient source. So, for example, if the NMP indicates that Field X will receive nitrogen from process wastewater and irrigation water in a certain year but the land application records indicate that only manure was applied, the permit term has not been violated. However, for the same scenario, if the land application records indicate that process wastewater and anhydrous ammonia were applied, the facility would be out of compliance with the permit term because the NMP had not accounted for the use of anhydrous ammonia.

In addition, the term does not limit the amount of nutrients supplied through "other additions." For example, a CAFO's NMP indicates that Field X will receive 100 pounds of nitrogen per acre from process wastewater and 50 pounds per acre of nitrogen from irrigation water. However, rainfall was lower than average and the CAFO operator had to irrigate more than anticipated, thereby supplying more nitrogen from irrigation water than expected. The term *accounting for all other additions of plant available nitrogen and phosphorus* is not violated because additional nitrogen was applied from irrigation water. However, in this case the inspector would need to check that the amount of nitrogen supplied from process wastewater was decreased accordingly so that the total nitrogen application did not exceed the term *total nitrogen recommendation for each crop*.

Form and Source of Manure that Is Land Applied

The inspector should compare the form and source of manure to be applied to each field and crop, identified in permit terms, with the land application records to see if the planned form(s) and source(s) were used.

Timing and Method of Land Application

The permit term for timing should be as specific as needed to reflect how the timing impacts nutrient availability in the application rate calculation. Therefore, the inspector should rely on the permit term, and not necessarily the application timing specified in the NMP to evaluate compliance. The specificity of the term will be guided by the state technical standards for nutrient management and, largely, the nitrogen availability factors that are required. For example, many states provide a single availability factor or mineralization rate for seasonal (i.e., fall or spring) application. In those states, the permit term might simply specify fall or spring application. In some cases, a permit term might be as specific as "within two weeks before planting." In most cases the CAFO's NMP will include a specific date for planned applications since most nutrient management planning programs require a specific date. EPA does not expect permit terms to require a specific application date. The compliance evaluation depends on the term that was identified for *timing of land application*. The inspector must make sure the actual nutrient applications identified in the facility records are consistent with the permit term.

The permit term for method of application will specify at least whether the surface or subsurface application is planned and may be as specific as identifying the type of equipment that will be used. The term should also reflect whether the manure is to be incorporated within a certain time frame. The CAFO inspector should evaluate land application records to see if the actual method of application, including time to incorporation, is consistent with the planned method reflected in the permit term.

Maximum Amount of Nitrogen and Phosphorus from Manure, Litter and Process Wastewater

The permit term will be expressed as the maximum pounds per acre of nitrogen that may be applied to each field for each year of permit coverage. The term will also include a maximum amount of phosphorus, in pounds per acre per year, for fields where application is limited to phosphorus-based rates. The inspector should evaluate land application records to see if the actual amount of nitrogen (or nitrogen and phosphorus where applicable) applied did not

exceed the amount specified in the permit term. The inspector should verify that the land application records document nutrient application using the same chemical forms used in the permit term.

Methodology to Account for the Amount of Nitrogen and Phosphorus in the Manure to be Applied

For the linear approach, only the actual amount of manure, litter, or process wastewater to be applied should vary on an annual basis since the maximum amount of N and P to be applied from manure is a permit term. The NMP and permit term should describe the specific methodology used to make this calculation. The amount of manure to be applied will depend on the results of the annual manure analysis and the calculation will be similar to the following:

$$\frac{Pounds\ of\ N\ or\ P\ to\ be\ applied\ per\ acre}{Pounds\ of\ N\ or\ P\ per\ ton\ or\ gallon\ of\ manure} = Tons\ or\ gallons\ of\ manure\ to\ be\ applied\ per\ acre$$

The inspector should check the CAFO's records to verify that the amount of manure to be applied was calculated in accordance with the methodology specified in the permit term. In general, the following information will be needed to make this determination using the formula above:

- *Maximum amount of N (and P as applicable) from manure, litter, and process wastewater*: This is a permit term and should be identified in the permit
- *Pounds of N (and P as applicable) per ton or gallon of manure:* The source for this data is the result of the manure analysis used to calculate the manure application rates. The inspector should check to be sure that the analysis is for a recent sample, taken no more than 12 months before the date of application, and that the analysis is representative of the material applied. Most importantly, the sample should represent the actual source of the manure, litter, or process wastewater applied. A sample may represent multiple sources (i.e., storage structures) only if the manure sources and management structures for those two sources are so similar as to support a reasonable expectation that that the nutrient content of the manure will be the same.

  Consider, for example, two dairies, each with a milking parlor, outdoor confinement areas, a solids separator, and two impoundments. At Dairy A, all process wastewater, including wash water from the milking parlor, flush water from the feed lane, and runoff from the pens flows to the solids separator. Effluent from the separator can be directed to either of the two impoundments; the dairy allows one impoundment to fill and then directs wastewater to the second impoundment while the first is being emptied. Because the contents of each impoundment are from the same source and managed the same, it is reasonable to expect that a wastewater taken from one impoundment would represent the nutrient content of both impoundments. At Dairy B, milk parlor wash water and feed lane flush water are directed to the separator. Effluent from the separator can be directed to either of the two impoundments. Runoff from the pens

flows directly to one of the impoundments. At this dairy, it may not be reasonable to expect that wastewater from both impoundments would have the same nutrient content since one impoundment receives wastewater from a source that is significantly different from the other (runoff from the pens).

The inspector should also make sure that the pounds of N or P per ton or gallon of manure used to calculate the amount of manure to apply is expressed using the same chemical form as provided on the manure analysis or has been calculated or converted appropriately. For nitrogen-based application rates, planners and CAFO operators often calculate the amount of plant available nitrogen in the manure to be applied. This is calculated by adding the inorganic forms (typically ammonium and nitrate) and the portion of organic nitrogen that will be available in the first year after application (based on the mineralization rates specified in the technical standards).

Terms Applicable to Narrative Rate Approach
Maximum Amount of Nitrogen and Phosphorus from All Sources of Nutrients

Different than the linear approach where land application rates are expressed in terms of the amount of nutrients to be applied from manure, the narrative rate approach sets an upper limit on the amount of nutrients to be applied from all sources. The term is the maximum amount of nitrogen and phosphorus derived from all sources of nutrients for each crop identified in the NMP in chemical forms determined to be acceptable to the Director, in pounds per acre, for each field. In the narrative rate approach, the maximum limit is identified only for each crop but does not need to be reported each year that the crop is planted.

The maximum amount of nitrogen from all sources under the narrative rate approach is based on the maximum amount of nitrogen that can be applied to a field for the specified crop based on crop type, yield goal, and current nitrogen soil test – where required. The maximum amount of nitrogen from all sources is the same value reported for the term, total crop nitrogen recommendation.

The maximum amount of phosphorus from all sources can be set for each crop according to the maximum amount of phosphorus applied in any one year for any one crop based on the outcome of the field-specific risk assessment. This preserves the flexibility of the narrative rate approach. Because the phosphorus site index changes with different crops and years, different rates of manure can be applied according to P-Index recommended rates. Manure may be applied at N-based rates for some years and crops and P-based rates for other years and crops.

EXAMPLE COMPLIANCE EVALUATION:
MAXIMUM AMOUNT OF NITROGEN AND PHOSPHORUS FROM ALL SOURCES OF NUTRIENTS

Compliance Evaluation

To evaluate this term, the inspector will check to see if a total crop nutrient recommendation exists for each crop included in the NMP. The total nutrients land applied must not exceed the calculated total crop nutrient recommendations for a specific crop.

Compliance Issues

- Nutrients applied from all sources exceed the total crop nutrient recommendation calculated for a specific crop.
- The CAFO did not calculate the maximum amount of nutrients that can be applied to a specific crop.
- The CAFO did not account for crop type, yield goal and current soil test when determining the total crop nitrogen recommendation.
- The CAFO did not conduct a field-specific risk assessment when determining the total crop phosphorus recommendation.

Alternative Crops

The narrative rate approach allows for greater flexibility than the linear approach by allowing the NMP to include alternative crops that may be planted in lieu of those included in the planned rotation. If alternative crops are included, the NMP must also identify for each alternative crop realistic yield goals and nitrogen and phosphorus recommendations. The term includes the alternative crops listed in the NMP, along with their associated yield goals and nitrogen and phosphorus recommendations.

EXAMPLE COMPLIANCE EVALUATION: ALTERNATIVE CROPS

Example: At CAFO A the north field typically is planted in wheat. However, when wheat prices drop, CAFO A plants alfalfa. CAFO A must include wheat and alfalfa plus their respectively yield goals and, nitrogen and phosphorus recommendations in the NMP.

Under the Narrative Approach, the methodology must account for the following factors:

- ✓ Credits for PAN in the field
- ✓ Amount of nitrogen and phosphorus in the manure to be applied
- ✓ Consideration of multi-year phosphorus application
- ✓ Accounting for all other additions of plant available nitrogen and phosphorus to the field
- ✓ Form and source of manure, litter and process wastewater
- ✓ Timing and method of land application
- ✓ Soil test results
- ✓ Volatilization of nitrogen and mineralization of organic nitrogen

Compliance Evaluation

The inspector should verify that any crop listed in CAFO A's land application records or actual crop(s) planted in the land application areas are included in the NMP.

Compliance Issues

- The crop observed growing in a land application area is not included in the NMP.
- During the review of land application records, a crop included in the manure application records is not listed in the NMP.

Methodology

Unlike the linear approach where permit terms are factors of the methodology, the factors themselves are not required to be terms in the narrative approach, but rather the methodology used to account for them in the CAFO's NMP is a term. Under the narrative rate approach, the methodology is the enforceable permit term, rather than the factors included.

As long as the methodology presented in the NMP is followed and includes all necessary factors, the calculated amount of manure, litter, or process wastewater can change from year to year.

EXAMPLE COMPLIANCE EVALUATION:
METHODOLOGY

Compliance Evaluation

As previously mentioned, the permit writer will have already ensured that the methodology used to calculate rates in the NMP is consistent with the permit and applicable technical standards. The inspector should see if the actual manure application rates are being calculated in accordance with the NMP methodology.

The following factors must be accounted for in calculating the rates of manure application:

- Credits for Plant Available Nitrogen (PAN) in the field
- Amount of nitrogen and phosphorus in the manure to be applied
- Consideration of multi-year phosphorus application
- Accounting for all other additions of plant available nitrogen and phosphorus to the field
- Form and source of manure, litter and process wastewater
- Timing and method of land application
- Soil test results
- Volatilization of nitrogen and mineralization of organic nitrogen

Compliance Issues

- CAFO is not able to document values used in the application rate calculations (e.g., no laboratory results for soil and manure analyses).
- Application rate calculations are based on a different methodology than presented in the NMP.
- CAFO does not account for additional commercial fertilizer applications or other sources of nutrients.

Records for Permitted Medium and Small CAFOs

Permitted medium and small CAFOs are subject to the same requirements as a Large Permitted CAFO, with the exception of the ELG. Permitted medium and small CAFOs must maintain records to document NMP development and implementation. See Table 2 below for examples of records that might be maintained to document implementation of the nine minimum measures as well as potential compliance alerts suggesting non-compliance with the specific requirements. Permitted medium and small CAFOs are not subject to the ELG. Any technology-based requirements and associated records will be specified in the permit for a medium or small CAFO and may be similar to the ELG requirements for large CAFOs.

Records for Unpermitted Large CAFOs

Unpermitted large CAFOs are not required to develop and implement an NMP, but are required to maintain records documenting implementation of nutrient management practices that address three of the nine NMP minimum measures to qualify for the agricultural stormwater exemption. Unpermitted large CAFOs must have records indicating that they are implementing 40 CFR Part 122.42(e)(1)(vi)-(ix) on their land application sites to ensure appropriate agricultural utilization of land applied nutrients. These practices ensure that precipitation-related discharges from the land application areas qualify for the agricultural stormwater exemption. As provided in Table 2 below, records must exist for measures 6 through 8.

Table 2: Example Records to Evaluate Minimum Measures

Measure	Example Records	Potential Compliance Alerts
Identify site-specific conservation practices to be implemented, including buffers or equivalent practices, to control runoff of pollutants to waters of the United States [40 CFR Part 122.42(e)(1)(vi)	• NMP or CNMP • Engineering drawings or as built drawings showing the location and dimension of berms, buffers, setbacks, and other conservation practices between land application fields or production areas and WOUS • Narrative descriptions of conservation practices implemented to control pollutant runoff, such as NRCS conservation practice standards	• The CAFO does not have documentation of buffers, setbacks, or other conservation practices to minimize nutrient runoff to nearby WOUS. • Conservation practices are identified but do not include operation and maintenance protocols to ensure long-term effectiveness to control pollutant runoff.

Measure	Example Records	Potential Compliance Alerts
Identify protocols for appropriate testing of manure, litter, process wastewater, and soil [40 CFR Part 122.42(e)(1)(vii)	• NMP or CNMP • A facility sampling plan that identifies sampling locations, sampling frequency, analytical methods, and laboratories for manure, litter, process wastewater, and soil analysis • Laboratory reports that identify testing procedures and results for manure, litter, process wastewater, and soil	• The CAFO land applies manure or wastewater without sampling the nutrient content of manure and soil. • Soil and manure analyses are not current. • Manure and process wastewater analysis are not representative of all sources that are land applied. • Soil analyses are not available for all fields used for land application. • Soil or manure analytical results are not consistent with those used to calculate land application rates.
Establish protocols to land apply manure, litter or process wastewater to ensure appropriate agricultural utilization of the nutrients in the manure, litter or process wastewater [40 CFR Part 122.42(e)(1)(viii)]	• Site map showing land application fields • NMP or CNMP • Manure spreading agreements • Manure application rate calculations in accordance with the methodology in the NMP • Land application records • Application equipment inspection logs	• No documentation of manure application rates, protocols, or schedules. • The CAFO land applies manure and/or wastewater without agronomic rate calculations supporting the application. • Manure application at rates higher than the rates calculated in accordance with the NMP. • Manure is applied at a constant rate across all fields and crop types. • Land application records are incomplete (e.g., do not specify manure source, amount, dates, application method, etc.). • Actual amount of nutrients applied is calculated at the end of the season rather than tracked for each application event. • Manure is applied to fields that are not identified in the NMP.

Appendix AP –
Inspection Report Template (R7)

INSPECTION REPORT TEMPLATE

Example: Structure for Model Inspection Report

All inspection reports should be structured and formatted is an organized way. This example identifies each of the major sections of the report. Each section in this example report has the purpose to communicate specific information as simply and cleanly as possible. This format can be adapted to all types of inspection reports.

It is essential to remember that our goal is clear communication of essential information. We can use our computers' ability to indent, bold, italics, color, change fonts, etc. to help us construct a clear and easy to understand report. Once your master report is completed you can use it to "cut and paste" into additional reports.

Comments: Comments are made throughout the report to highlight important points or identify critical information. Comments are shown in brackets and *[italics]*.

Boiler Plate: Certain sections of the report should use "boiler plate" language. This language should be used for all inspection reports. Slight modifications may be made to accommodate changes in inspection type.

Attachments: Attachments are to be listed in a logical order from Attachment 1, at the beginning of the report, to Attachment 1 + n, at the end of the report. Please reference Attachments as often as needed to clearly present your findings.

Photographs: Photographs need to be referenced, and referenced as often as needed. All photograph numbers should match the photograph log from the field. Photo location and direction should be noted on maps or diagrams using a circle with the photo number in it and an arrow to note direction (♂).

Acronyms: All acronyms will be defined at their first use. For example: I conducted a Confined Animal Feeding Operation (CAFO) inspection at Beefmaster Feeders (BF).

REPORT OF CONFINED ANIMAL FEEDING OPERATION INSPECTION

At

BEEFMASTER FEED YARD

Rural Route 2, Box 31
Tall Prairie, Kansas

NPDES Permit Number: KS023764
[use appropriate media program ID or Permit number]

June 5, 2005

By

U.S. ENVIRONMENTAL PROTECTION AGENCY
Region VII
Enforcement Coordination Office

[The title area should be center justified, Arial font, bold, size 12, and capitalized as shown]

1.0 INTRODUCTION *[All section headings should be left justified, Arial font, bold, size 12, and all capitalized. This section describes who requested the inspection and under what authority it was conducted.]*

[Boiler plate – Use correct name, address, and date]

At the request of the Water, Wetlands and Pesticides Division, Water Enforcement Branch, I performed a Concentrated Animal Feeding Operation (CAFO[3]) inspection at Beefmaster Feed Yard on June 5, 2005. This inspection was performed pursuant to Section 308(a) of the Federal Water Pollution Control Act, as amended. The CAFO inspection was conducted as a Level B Multimedia Inspection, and the *Region 7 Multimedia Screening Checklist* (MMSC) is included as Attachment 1 *[if completed]*. This narrative report and attachments present the findings and observations made during the inspection.

[The text of the general body of this report should be left justified, Times New Roman font, size 12, and double-spaced after each period. Please be careful not to allow "widows and orphans" and ensure that new section titles are not be left dangling at the bottom of the page.]

2.0 PARTICIPANTS

[List all those who participated in the inspection activity: name, title, organization)

Beefmaster Feed Yard (BFY):
Tex Ritter, General Manager*
Jill Oakly, Safety Manager*
Kansas Department of Environment (KDE):
John Wayne, Inspector*
U.S. Environmental Protection Agency (EPA):
Angus Steak, CAFO Inspector

*Copy of business card included in Attachment 2 .

3.0 INSPECTION PROCEDURES

[Boiler plate -- Note: In this section, you describe the general procedures used during your inspection, including: SOPs used, initial facility contact, initial site entry, personal identification, purpose, scope, objectives and flow of the inspection, verification that you are at the correct facility and that you are talking with the correct person who can act as the official facility representative, confidential business information, notices of potential violations, and Section 1001 and 1002 of US Code, etc.]

I conducted this inspection in accordance with the procedures described herein and the following EPA Region VII Standard Operating Procedures (SOPs), unless otherwise noted:

SOP No.	
2332.09	Bio-Security Procedures for Conducting NPDES Compliance Evaluations at Animal Feeding Operation
A29392	Sampling of CAFO wastes. *[if sampling occurred]*

[List all applicable SOPs that are used.]

Prior to beginning the inspection, I conducted a visual reconnaissance of the BFY facility and its surroundings from the public right-of-way. This included State Hwy 24, County road "H" and an un-named road on the north side of the facility. During my reconnaissance, I searched for areas of environmental concern, discharges, drainage patterns, flow directions, distance and direction of nearest perennial waters, visual condition of perennial waters, facility location and layout and potential issues covered on the MMSC. I identified no obvious environmental issues or concerns during this preliminary examination. *[If you did identify a significant issue, state briefly what is was and that it will be fully described later in the report.]*

I contacted Mr. Ritter *[who]*, General Manager, of BFY, by telephone *[how]*, on June 4, 2005, the day before the inspection, at approximately 1300 hrs *[when]*. I conducted this pre-notification to facilitate my access to the facility *[why]*. I informed Mr. Ritter that I would be conducting an inspection at his facility *[where]* on the afternoon of June 5 *[when]*. I asked him if he would be available at that time. He said that he would. Additionally, Mr. Wayne, the KDHE inspector, accompanied me during the inspection. *[The theme of answering the questions of*

*who, what, when, where, how, and why, **MUST** run throughout you report and each of the questions needs to be answered to the best of your ability.]*

I arrived at BFY at approximately 1400 hrs on June 5, 2005. Upon arrival, I introduced myself and presented my credentials to Mr. Ritter and Ms. Oakly. I also provided them my business card. I asked Mr. Ritter if he was able to act as the "Official Facility Representative" for the BYF. He said that he would represent the facility. I asked him what he was responsible for and how long he had those responsibilities. Mr. Ritter said that he is responsible for the overall management of the facility and that he had been the General Manager for the last ten years. He said Ms. Oakly was BFY's Safety Manager, and that she has held that position for the last eight years. Ms. Oakly verified what Mr. Ritter said, and explained she was responsible for all environmental management and compliance activities at BFY.

I explained to them that I would be conducting a Concentrated Animal Feeding Operation (CAFO) inspection under the authority of Section 308 (a) of the Federal Water Pollution Control Act to evaluate their compliance status with their NPDES permit *[if the facility is not permitted, you would say, "their compliance with the requirements of the CWA and determine whether or not they require a permit"]*. I also informed them that I would also be evaluating compliance with several other regulatory requirements through the completion of a Multimedia Screening Checklist. I explained that the inspection would consist of a review of facility operations, required records, waste generation and management practices, and a visual inspection of the site. I stated that I would document my findings and observations by making copies, taking photographs and/or videos, obtaining statements from facility staff, and collecting samples if necessary *[state: "and by collecting samples," if this was a sampling inspection].*

I explained to Mr. Ritter and Ms. Oakly that in order to fully understand their operations and properly evaluate their compliance status, it is important that I collect truthful and accurate information. I asked them to inform me anytime they were uncertain about what they were providing me or if they did not understand what I was asking. I presented Mr. Ritter and

Ms. Oakly a copy of *Section 1001 and 1002 of the U.S. Federal Code*** concerning making false statements to federal inspectors. I asked them if they understood Section 1001 and 1002. They said, "Yes, they did."

At the conclusion of the inspection, I summarized my preliminary findings and observations to Mr. Ritter and Ms. Oakly. I explained BFY's right to make a claim of business confidentiality and presented Mr. Ritter with a *Confidentiality Notice*** (Attachment 3). Mr. Ritter did not make any confidentiality claims at the time of the inspection. I prepared a *Receipt for Documents and Samples*** (Attachment 4) for all material I received from Mr. Ritter and provided him with a copy of the receipt *[if copies or other material were received]*. I completed an In-Briefing/Exit-Briefing checklist and a CAFO inspection checklist during the inspection (Attachments 5 and 6 respectively). I prepared and presented Mr. Ritter with a *Notice of Preliminary Findings* **(NOPF -Attachment 7) form. I explained that this form documents those observations and preliminary findings made during the inspection process and that the preliminary findings are based on my knowledge of what I observed and knew at the time. I also explained that these findings do not constitute a final enforcement determination and are provided to assist the

facility in their compliance efforts. I explained his need to respond within 10-days. Mr. Ritter acknowledged receipt of these forms by signing them.

*[** Titles of documents should be in italic print]*

4.0 FACILITY DESCRIPTION

[This section of the report will vary based on the facility inspected and the specific findings, observations, and potential violations and regulatory concerns you identify. Please use the format and cover each section identified below.

Please focus on using short, easy to understand sentences, and a separate paragraph for each new train of thought or topic. Use first person, active voice, and strive to present the material in order to minimize your chance of being misunderstood.

For each statement or fact that you present, you must be able to describe or explain "How you know what you know." If it is not obvious to the reader how you know or knew it, either do not include the statement, rewrite the statement, obtain the appropriate information need to demonstrate how you know what you are saying. If necessary, identify areas where additional inquiry is needed.

For each potential violation or regulatory concern, present the information using a "Compare and Contrast style." Make sure you address each "Element of Proof" for each component of the potential violation identified in the law, permit, or regulation. This is essential to a good report. For example, a large CAFO needs to have 1000 head of cattle (Element of proof #1) on-site for more then 45-days/year (Element of proof #2) – I counted 2750 head on the day of the inspection and Mr. Ritter's inventory records (Attachment) show that he had at least that number of cattle on-site for 250 days during the last year.]

4.1 Facility Operations

[This section should provide a brief description of the facility location, the owner, the operator (if different from the owner), number of employees, years at this location, prior operations at this location, size, and a general overview of operations. A more specific description of operations should be described in the sections of this report were the specific description relates directly to the compliance requirements.]

According to Mr. Ritter, BFY is located approximately 3 miles north of Tall Prairie, Kansas (see map, Attachment). The facility address is 40410 NW 20th Avenue, Tall Prairie, KS. *[Note mailing address if different]* The legal description is contained in (Attachment – *[Do not copy the legal description into the report if possible as they are very exact and errors can be easily made)*.

Mr. Ritter stated that the facility employs three full time employees and 2 seasonal employees. He said that BFY was constructed in 1962 has been a feeding operation ever since. He said that Mr. Beefmaster owns BFY.

Mr. Ritter stated that BFY operates a feedlot on approximately 201 acres which are divided into 25 pens. He said that BFY also leases an additional 7,000 acres (see map, Attachment) for grazing, corn production, and land application. He said that BFY currently has approximately 3550 head of cattle in the pens and that he is permitted for a maximum of 5000 head. He said

that all runoff from the 25 pens drain through a series of ditches and runoff control berms into a single five acre lagoon. Mr. Ritter said that he has three center pivot irrigation units for land application of lagoon wastewater on approximately 60 acres.

Mr. Ritter said that manure from the pens is scraped weekly and sold to a composting operation located adjacent to the facility. He said that BFY has three manure storage areas onsite (shown in Attachment .) Mr. Ritter said the runoff from these manure storage areas is captured by the facility lagoon system.

Mr. Ritter also said that BFY has one 500-gallon used oil tank, one 1000-gallon diesel tank, and two 560-gallon gas tanks (Photos 1-3).

4.2 CAFO Status and NPDES Permit Status

[In this section, you need to demonstrate that you have determined that the facility meets the minimum criteria to be subject to the CAFO requirements and you should identify if they are a permitted facility and their key permit requirements, e.g., maximum capacity and that the permit was still in force and has not expired.]

BFY has an NPDES permit for their CAFO that limits the maximum number of cattle to 5000 head. The permit was issued by NDEQ on December 12, 2003 (Attachment). The permit will expire on December 11, 2008. I inspected the facility for compliance with the permit requirements. *[If the facility does not have a permit, skip this type of paragraph.]*

Based on my observations of the cattle on-site, a review of facility records and statements by Mr. Ritter, BFY is confining at least 1,000 (total) head of cattle for more than 45 days during the last twelve month period. During my inspection, I estimated the number of cattle in each of the pens to be approximately 3300-3700 head on the day of the inspection. I reviewed inventory and sales documents which show that there were more than 2500 head on-site continuously during the last 12 month period (Attachment). Mr. Ritter stated that he had 3550 head on the day of the inspection and that there were at least 2500 head on-site during the last 12 months. My inspection of the pens also revealed no vegetative cover in any of the pens (see photo 6-10). As a result of my observations, this facility meets the definition of large CAFO as it is defined at Title 40 of the Code of Federal Regulations, Part 122.23.

4.3 Regulatory History

[Please describe any past inspection activities, compliance orders, previous violations, concerns, or other issues found during your file review or inspection that may affect potential enforcement at this facility. Remember who, when, and what.]

The Nebraska Department of Environmental Quality conducted an inspection of the facility on December 2, 2004 (Attachment). The inspection report lists the following as areas of concern: *[NEVER make a statement like "The inspection report states that the facility was in compliance at the time of the inspection." This is unnecessary and only opens the door to questions and other issues regarding EPA vs. State findings.]*

1. The facility was granted a 90-day extension to complete the permeability tests on the lagoon. The deadline for completion is now March 12, 2005.

2. KLA Environmental will be conducting the permeability test. To conduct this test, the water level of the lagoon needs has to be increased by 1 ft in order to float the test equipment. It is estimated that it will take two days to complete the test and return the water level to its original level.

I asked Mr. Ritter what were the results of the permeability tests and if the lagoon was returned to its original level within the two days. He said that the tests were completed on March 2, 2005 and that the permeability of the soil met the permit requirements (Attachment). He also said that he dewatered the lagoon after the test in order to immediately return it to its original level.

On August 24, 1999, EPA Region VII conducted an inspection of the facility. This inspection led EPA to issue an administrative compliance order (ACO) to the facility on December 21,1999 (See Attachment). The following is a summary of the violations listed in the ACO:

1. The facility did not record the freeboard levels in the lagoons on a daily basis when the levels were less than required by the NPDES permit.
2. Wastewater was land applied during days with precipitation in excess of 0.05 inches and on days immediately preceded by more than 0.05 inches of precipitation.
3. Pond #9 was not completed as described in the facility NPDES permit.
4. Pond #5 did not have a staff gauge.
5. The staff gauges in the remainder of the ponds were tilted and leaning in such a way that determining the required depth was difficult.

5. FINDINGS AND OBSERVATIONS

[In this section you will identify your findings and observations on the day of the inspection. Include rainfall data from nearest official weather station if it is or has been raining within the week prior to the inspections. Remember to include distance, slope, and drainage information to the nearest perennial waters of the U.S.]

Mr. Ritter said he recorded 0.65 inches of precipitation at the feed yard the day before the inspection. I reviewed the last three years of precipitation records required by BFY's permit and observed that the recent rainfall events had been recorded, as well as, previous rainfall events for the past three years. Except for the dust being minimized on the day of the inspection, I did not observe any other impacts of the limited amount of rainfall on the day before the inspection.

Mr. Ritter said that BFY uses tractor-pulled scrapers to clean the pens on a weekly basis to keep them clean and dry. During my inspection of the pens, they appeared to be well maintained (photo). I also verified that the drainage from all of the pens would flow into the lagoon during a rainfall event by physically observing the slope and flow control structures, i.e., ditches flowing to the lagoon. If an overflow were to occur, it would flow from the northeast corner of the lagoon dam (photo) into Jenkins Creek. According to the USGS topographical map, Jenkins Creek is the nearest perennial stream and is approximately 200 yards from the lagoon dam (Attachment).

I inspected the three manure piles located south of the lagoon (see map) and noted that two were quite large (photo) and one was much smaller (photo). I verified that the drainage from the manure piles goes to the lagoons as described by Mr. Ritter. Mr. Ritter said that all of the manure generated by the facility is either sold to a composting operation, located adjacent to the feedlot, or is given away to private individuals. Mr. Ritter provided me with a copy of his records showing the amount of manure picked up by the composting operation (B&G Potting Soil, Inc.) or given away from January 13, 2003 to the present (See sales records Attachment).

During the inspection, I observed the freeboard level in the facility lagoon and compared it against what was specified in BFY's permit.

> ***NOPF #1 – Failure to Maintain Adequate Freeboard*** *- Section B, Operation and Maintenance Requirements, of the facilities NPDES permit states: "Whenever the available storage capacity is less than the amounts specified in Table 1, dewatering shall be initiated and conducted on all days suitable for land application of wastes until the required storage capacity is again available." Table 1 requires that a freeboard level of five feet be maintained. I observed that the freeboard level was four feet on the day of the inspection. I obtained this level by reading it off the staff gage located in the South end of the lagoon. According to Mr. Ritter, this is the deepest portion of the lagoon.*
>
> *Mr. Ritter said that he had been busy and just did not get around to pumping down the lagoon. He also said that he was aware of the five foot minimum level.*
>
> ***NOPF #2 – Failure to Fully Maintain Monthly Operating Log*** *- Section C, Operation and Maintenance Requirements, of the facilities NPDES permit states: "A written operational*

log shall be maintained. For each day waste is applied, information recorded shall include; soil condition (frozen/ thawed, etc.), quantity of waste applied, and the area where the waste was applied." During my review of BFY's monthly operating log, I observed that the condition of the soil in the land application area is not specified on land application days (Attachment). Mr. Ritter land applies over approximately 60 acres with center pivot irrigation systems.

The current NPDES permit does not specify the amount of time the facility is required to wait following a precipitation event until land application can proceed.

***NOPF #3: Failure to Maintain Records for Three Years** – Appendix 3 of BFY's permit, requires BFY to maintain daily records of lagoon levels. During my review of the records, I observed that BFY was not keeping a log of daily lagoon levels prior to March 16, 2003 (Attachment). Mr. Ritter said that he first became aware of this requirement as a result on an December 2, 2004 NDEQ inspection.*

[NOTE 1: All potential violations and/or concerns should be described using separate, indented paragraphs, italics and bold text as shown above. It is critical that they stand out from the rest of the report.

Note 2: If this facility did not have a permit, you should document the same type of information that a basic NPDES CAFO would require, just not cite it on the NOPF.]

Example of Sampling:

According to BFY precipitation logs (Attachment), BFY had three inches of rain in the last 48 hours. This is much less then the seven inches of a 25 year, 24-hr storm event.

***NOPF #4: Discharging in Excess of Permit Limitations** - Section D, Discharges, of BFY's permit states: "The facility will not discharge any wastewater unless it is the result of a 25 year, 24-hour storm event." I observed the lagoon overflowing (photo). I followed the overflow, down gradient, approximately 200 yards to where it entered Jenkins Creek (photo 10, note dark discoloration of the overflow material). As I walked this path, I took readings with my inclinometer at several points (see map) and noted that the grade was approximately 5%. I collected samples approximately 100 yards up-stream from the discharge point (point A), at the discharge point (point B), and approximately 100 yards down stream of the discharge point (point C). The samples show (Attachment – Analytical Sample Data) an increase in fecal coliform in the receiving stream from the upstream point (point A) to the downstream point (point C). What is notable about the results, is that the concentration of fecal coliform at point C is approximately 60 times higher than it was upstream (point A). The concentration of fecal coliform downstream was 1,750,000 CFU/ 100ml. The NDEQ Water Quality Standards establish a limit of 200 CFU/ 100 ml for all state waterbodies if there is a possibility it can be used for full body contact recreation. Jenkins Creek is routinely used for swimming by local children near the stream access (point D), approximately ¾ mile downstream from the discharge point B. Sampling at point D showed a fecal coliform concentration of 600,000 CFU/100ml, well above the state standard.*

[Note 3: If the facility is discharging to Waters of the U.S. and they do not have a permit, you would cite them for "Unlawful Discharge of Pollutants to Water of the U.S." per Section 301 , CWA.]

6. OTHER REGULATORY CONCERNS

As noted earlier, I conducted this inspection as a Level B Multimedia inspection. Part of the MMSC covers the requirements for Spill Prevention Control and Countermeasures (SPCC). I observed five fuel storage tanks on-site during the inspection. I observed that two of the tanks, identified as T1 and T2 by Mr. Ritter (photo), were being used and three were in the process of construction. The smaller of the two tanks (T-1) had a capacity of 1,000 gallons and, according to Mr. Ritter, contained #2 off-road diesel. Mr. Ritter also stated that the larger tank (T-2) had a capacity of 4,000 gallons and contained unleaded gasoline. I asked Mr. Ritter if these two tanks were full. He said yes, that they had just been filled last month (see fuel receipt, Attachment). The three new tanks each will have a capacity of 1000-gallons each and will have secondary containment.

> ***Concern: Failure to Have and SPCC Plan or Secondary Containment*** *– 40 CFR Part 112 requires all oil tanks with a combined capacity of greater than 1320 gallons to have secondary containment and an SPCC plan approved by a Professional Engineer. I did not observe secondary containment around either tank T-1 or T-2 (photo). Mr. Ritter stated that he did not have an SPCC plan.*

I observed one maintenance shop located on the west side of the facility (see map). Mr. Ritter said that the shop generates used oil but he did not know what the generation rate was. He said that used oil is stored in an approximately 2000-gallon tank on the north side of the shop.

CONCERN: Labeling of Used Oil Tank *- 40 CFR Part 279 requires all generators of used to label their used oil containers with the words "USED OIL." I observed that the used oil tank was not labeled with the words used oil (photo).*

_____ _____

Angus Steak, CAFO Inspector Date

ATTACHMENTS:

1. Multimedia Screening Checklist (1 page)
2. Copy of Business Cards (varies)
3. Confidentiality Notice (1 page)
4. Receipt for Documents and Samples (1 page)
5. In-Briefing/Exit-Briefing checklist (1 page)
6. CAFO Inspection Checklist (? pages)
7. Notice of Potential Violations (3 pages)
8. Other attachments listed in order

Photographs (18)

Appendix AQ –
Media-Specific Inspection Components

The information in this appendix was excerpted from NEIC's *Multimedia Investigation Manual*

The information presented in this appendix includes many significant tasks for several media-specific inspection areas. Media discussed include hazardous waste, air, drinking water, toxic substances, and pesticides; emergency planning/community right-to-know and the Superfund program are also discussed.

A. Resource Conservation and Recovery Act (RCRA)

Subtitle C Hazardous Wastes

Evaluating Compliance

Under RCRA Subtitle C, hazardous wastes are subject to extensive regulations on generation, transportation, storage, treatment, and disposal. A manifest system tracks shipments of hazardous wastes from the generator through ultimate disposal. This "cradle-to-grave" management is implemented through regulations and permits.

In determining the facility status under RCRA, the investigator must decide whether the facility is a generator, transporter, and/or Treatment, Storage, and Disposal Facility (TSDF), and whether the facility is permitted or has interim status. Generally, EPA Regional and State offices maintain files for the facility to be inspected. Information may include:

- A list of wastes that are treated, stored, and disposed and how each is managed (for TSDFs)
- A list of hazardous wastes generated, their origins, and accumulation areas (for generators)
- Biennial, annual, or other reports required by RCRA and submitted to the regulatory agencies; these include any required monitoring reports
- A detailed map or plot plan showing the facility layout and location(s) of waste management areas
- The facility RCRA Notification Form (Form 8700-12)
- The RCRA Part A Permit Application (for TSDFs)
- The RCRA Part B Permit application (for TSDFs, if applicable)
- The RCRA permit (for TSDFs, if applicable)
- Notifications and/or certifications for land disposal restrictions (for generators).

Generators

Hazardous waste generators are regulated under 40 CFR Parts 262 and 268. These regulations contain requirements for:

- Obtaining an Environmental Protection Agency (EPA) Identification Number
- Determining whether a waste is hazardous

- Managing wastes before shipment
- Accumulating and storing hazardous wastes
- Manifesting waste shipments
- Recordkeeping and reporting
- Restricting wastes from land disposal (also regulated under Part 268).

The generator regulations vary, depending upon the volume of hazardous wastes generated with fewer requirements for smaller generators. Large Quantity Generators (LQGs) generate greater than 1000 kg of hazardous waste/month, Small Quantity Generators (SQGs) generate less than 1000kg/month but more than 100 kg/month, while Conditionally Exempt Small Quantity Generators (CESQGs) generate less than 100 kg/month. The investigator must determine which regulations apply. Additionally, the investigator should do the following:

- Verify that the generator has an EPA Identification Number that is used on all required documentation (e.g., reports, manifests, etc.).
- Confirm that the volume of hazardous wastes generated is consistent with reported volumes. Examine the processes generating the wastes to assure that all generated hazardous wastes have been identified. Look for improper mixing or dilution.
- Ascertain how the generator determines/documents that a waste is hazardous. Check to see wastes are properly classified. Collect samples, if necessary.
- Determine whether pre-transport requirements are satisfied, including those for packaging, container condition, labeling and marking, and placarding.
- Determine the length of time that hazardous wastes are being stored or accumulated. Storage or accumulation for more than 90 days requires a permit (facilities that generate less than 1000 kg/month of hazardous waste are allowed to store/accumulate for up to 180 days without a permit). Generators storing for less than 90 days must comply with requirements outlined in 40 CFR Part 262.34.
- Verify RCRA reports and supporting documentation for accuracy, including inspection logs, biennial reports, exception reports, and manifests (with land disposal restriction notifications and/or certifications).
- Watch for accumulation areas which are in use but have not been identified by the generator. Note: Some authorized State regulations do not have provisions for "satellite storage" accumulation areas.
- Determine whether a generator has the required contingency plan and emergency procedures, whether the plan is complete, and if the generator follows the plan/ procedures.
- Determine whether hazardous waste storage areas comply with applicable requirements.
- Facilities with their own vehicle maintenance garage should be evaluated to assure that wastes such as used oil, anti-freeze, solvents, and paints are disposed of properly.

Transporters Hazardous waste transporters (e.g., by truck, ship, or rail) are regulated under 40 CFR Part 263, which contains requirements for:

- Obtaining an EPA Identification Number
- Manifesting hazardous waste shipments
- Recordkeeping and reporting
- Sending bulk shipments (by water, rail).

Storage regulations apply if accumulation times at transfer stations are exceeded. Transporters importing hazardous wastes, or mixing hazardous wastes of different Department of Transportation (DOT) shipping descriptions in the same container, are classified as generators and must comply with 40 CFR Parts 262 and 268. Investigators evaluating transporter compliance should do the following:

- Verify that the transporter has an EPA identification number that is used on all required documentation (e.g., manifests).
- Determine whether hazardous waste containers stored at a transfer facility meet DOT pre-transport requirements.
- Verify whether the transporter is maintaining recordkeeping and reporting documents, including manifests, shipping papers (as required), and discharge reports. All required documents should be both present and complete.

Treatment, Storage, and Disposal Facilities

Permitted and interim status TSDFs are regulated under 40 CFR Parts 264 and 265, respectively. (40 CFR Part 264 applies only if the facility has a RCRA permit (i.e., a permitted facility); 40 CFR Part 265 applies if the facility does not have a RCRA permit (i.e., an interim status facility). These requirements include three categories of regulations consisting of administrative requirements, general standards, and specific standards. The investigator should do the following activities to determine compliance with Subparts A through E:

- Verify that the TSDF has an EPA Identification Number that is used on all required documentation.
- Determine what hazardous wastes are accepted at the facility, how they are verified, and how they are managed.
- Compare wastes managed at the facility with those listed in the Hazardous Waste Activity Notification (Form 8700-12), the Parts A and B permit applications, and the permit.
- Verify that the TSDF has and is following a waste analysis plan kept at the facility; inspect the plan contents.
- Identify and inspect security measures and equipment.
- Review inspection logs to ensure they are present and complete. Note problems and corrective measures.

- Review training documentation to ascertain that required training has been given to employees.
- Inspect waste management areas to determine whether reactive, ignitable, and incompatible wastes are handled pursuant to requirements.
- Review preparedness and prevention practices and inspect related equipment.
- Review contingency plans; examine emergency equipment and documented arrangements with local authorities.
- Examine the waste tracking system and associated recordkeeping/reporting systems. Required documentation includes manifests and biennial reports, and may include unmanifested waste reports and spill/release reports. Relevant documents may include on-site waste tracking forms.
- Verify that the operating record is complete according to 40 CFR 264.73 or 265.73.

The investigator can determine compliance with standards in Subparts F through H by doing the following:

- For permitted facilities, verify compliance with permit standards with respect to ground water monitoring, releases from solid waste management units, closure/post-closure, and financial requirements.
- For interim status facilities required to monitor ground water, determine what kind of monitoring program applies.
- Depending on the type of investigation, examine the following items to determine compliance:
  - Characterization of site hydrogeology
  - Sampling and analytical records
  - Statistical methods used to compare analytical data
  - Analytical methods
  - Compliance with reporting requirements and schedules
  - Sampling and analysis plan (for content, completeness, and if it is being followed)
  - Conditions, maintenance, and operation of monitoring equipment, including wellheads, field instruments, and sampling materials
  - Construction/design of monitoring system
  - Assessment monitoring outline and/or plan
  - Corrective action plan for permitted facilities and for interim status facilities under 3008(h) enforcement actions.
- For waste management units undergoing closure, review the closure plan (including amendments and modifications), plan approval, closure schedule, and facility and regulatory certification. Examine response actions to any release of hazardous waste constituents from a closed or closing regulated unit.

- For waste management units in post closure care, inspect security measures, ground water monitoring and reporting, and the maintenance and monitoring of waste containment systems.
- Verify that the owner/operator has demonstrated financial assurance regarding closure.

Specific Hazardous Waste Management Units

The technical standards in 40 CFR Part 264 (Subparts I through O and Subpart X) and 40 CFR Part 265 (Subparts I through R) govern specific hazardous waste management units used for storage, disposal, or treatment (e.g., tanks, landfills, incinerators). Standards for chemical, physical, and biological treatment at permitted facilities under 40 CFR Part 264 have been incorporated under Miscellaneous Units, Subpart X. The investigator should do the following:

- Identify all hazardous waste management areas and the activity in each area; compare the areas identified in the field with those listed the permit or permit application, as appropriate. Investigate inconsistencies between actual practice and the information submitted to regulatory agencies.
- Verify that the owner/operator is complying with applicable design, installation, and integrity standards; field-check the design, condition, and operation of waste management areas and equipment.
- Determine how incompatible wastes and ignitable or reactive wastes are managed.
- Verify that the owner/operator is conducting self-inspections where and when required; determine what the inspections include.
- Identify and inspect required containment facilities for condition and capacity; identify lead detection facilities.
- Determine whether hazardous waste releases have occurred and how the owner/ operator responds to leaks and spills.
- Verify that the owner/operator is complying with additional waste analysis and trial test requirements, where applicable.
- Check the closure/post-closure procedures for specific waste management units (surface impoundments, waste piles, etc.) for regulatory compliance.
- For landfills, determine how the owner/operator manages bulk and contained liquids.
- Field-check security and access to waste management units.
- Determine the facility monitoring requirements (for air emissions, ground water, leak detection, instrumentation, equipment, etc.) and inspect monitoring facilities and records.

Land Treatment Facilities

When inspecting land treatment facilities, the investigator should also review the following items:

- Soil monitoring methods and analytical data.
- Comparisons between soil monitoring data and background concentrations of constituents in untreated soils to detect migration of hazardous wastes.
- Waste analyses done to determine toxicity, the concentrations of hazardous waste constituents, and, if food-chain crops are grown on the land, the concentrations of arsenic, cadmium, lead, and mercury in the waste(s). The concentrations must be such that hazardous waste constituents can be degraded, transformed, or immobilized by treatment.
- Runon and runoff management systems.

Incinerators

When evaluating compliance of interim status incinerators, the investigator also should review and/or inspect the following items:

- Waste analyses done to enable the owner/operator to establish steady-state operating conditions and to determine the pollutants that might be emitted.
- General procedures for operating the incinerator during start-up and shut-down.
- Operation of equipment used for monitoring combustion and emissions control, monitoring schedules, and data output.
- The incinerator and associated equipment.

For permitted incinerators, the investigator must evaluate the incinerator operation against specific permit requirements for waste analysis, performance standards, operating requirements, monitoring, and inspections. The investigator also should do the following:

- Verify that the incinerator burns only wastes specified in the permit
- Verify methods to control fugitive emissions
- Determine waste management practices for burn residue and ash.

Thermal Treatment Facilities

The investigator evaluating compliance of thermal treatment facilities in interim status also should review the following items:

- General operating requirements, to verify whether steady-state operating conditions are achieved, as required.
- Waste analysis records, to ensure that (a) the wastes are suitable for thermal treatment and (b) the required analyses in 40 CFR Part 265.375 have been performed.

Thermal treatment facilities permitted under 40 CFR Part 264 Subpart X will have specific permit requirements.

Biological Treatment Facilities

The investigator evaluating compliance of chemical, physical, and biological treatment facilities in interim status also should do the following:

- Determine the general operating procedures.
- Review the waste analysis records and methods to determine whether the procedures are sufficient to comply with 40 CFR Part 265.13.
- Review trial treatment test methods and records to determine whether the selected treatment method is appropriate for the particular waste.
- Examine procedures for treating ignitable, reactive, and incompatible wastes for compliance with Subpart Q requirements.

Chemical, physical, and biological treatment facilities permitted under Subpart X will have specific permit requirements.

Air Emission Standards

Owners/operators of TSDFs and generators with 90-day unites must comply with air emission standards contained in Subparts AA, BB, and CC of 40 CFR Parts 264 and 265. Subparts AA and BB establish standards for equipment containing or contacting hazardous wastes with organic concentrations of at least 10 percent. This equipment includes:

- Process vents
- Pumps in light liquid service
- Compressors
- Sampling connecting systems
- Open-ended valves or lines
- Valves in gas/vapor service or in light liquid service
- Pumps and valves in heavy liquid service, pressure relief devices in light liquid or heavy liquid service, and flanges and other connections.

Total organic emissions from process vents must be reduced below 1.4 kg/hr. and 2.8 mg/yr. The other equipment types above must be marked and monitored routinely to detect leaks. Repairs must be initiated within 15 days of discovering the leak.

Subpart CC establishes standards for units managing hazardous wastes with organic concentrations of greater than 500 ppmw at the point of waste origination. The following types of units must be controlled:

- Tanks
- Containers
- Surface impoundments
- Miscellaneous Subpart X units

The facility operating record should contain information documenting compliance with the air emission standards. A complete list of required information is in 40 CFR Parts 264.1035, 264.1064, 265.1035, and 265.1064. Permitted facilities must submit semiannual reports to the Regional Administrator outlining which valves and compressors were not fixed during the preceding 6 months. The investigator can do the following things:

- Visually inspect the equipment for marking.
- Review documentation in the operating record and cross-check this information with that submitted to the Regional Administrator in semiannual reports.

Land Disposal Restrictions

Land Disposal Restrictions (LDR) in 40 CFR Part 268 prohibit land disposal of hazardous wastes unless the waste meets applicable treatment standards as listed in 40 CFR Part 268.40-43. The treatment standards are expressed as (1) contaminant concentrations in the extract or total waste or (2) specified technologies.

Notifications and certifications comprise the majority of required LDR documentation. Notifications tell the treatment or storage facility the appropriate treatment standards and any prohibition levels that apply to the waste. Certifications are signed statements telling the treatment or storage facility that the waste already meets the applicable treatment standards and prohibition levels.

Investigators evaluating hazardous waste generators for LDR compliance should do the following:

- Determine whether the generator produces restricted wastes; review how/if the generator determines a waste is restricted.
- Review documentation/data used to support the determination that a waste is restricted, based solely on knowledge.
- Determine how/if a generator determines the waste treatment standards and/or disposal technologies.
- Verify whether the generator satisfies documentation, recordkeeping, notification, certification, packaging, and manifesting requirements.
- Ascertain whether the generator is, or might become, a TSDF and subject to additional requirements.
- Determine who completes and signs LDR notifications and certifications and where these documents are kept.
- Review the waste analysis plan if the generator is treating a prohibited waste in tanks or containers.

Investigators evaluating TSDFs should do the following:

- Ensure the TSDF is complying with generator recordkeeping requirements when residues generated from treating restricted wastes are manifested offsite.
- Verify whether the treatment standards have been achieved for particular wastes prior to disposal.
- Review documentation required for storage, treatment, and land disposal; documentation may include waste analyses and results, waste analysis plans, and generator and treatment facility notifications and certifications.

Subtitle I—Underground Storage Tanks (USTs)

Evaluating Compliance

Because the tanks are located underground, visual/field observations have limited application in determining compliance for USTs. The UST program relies heavily on the use of documents to track the status and condition of any particular tank.

Interviews with facility personnel are important when determining compliance with any environmental regulation. Questions regarding how the facility is handling its UST program will give the inspector insight into the types of violations that may be found. Topics to be covered in the interview include:

- Age, quantity, and type of product stored for each onsite tank.
- How and when tanks have been closed.
- Type of release detection used on each tank (if any); some facilities may have release detection on tanks where it is not required.
- Type of corrosion protection and frequency of inspections.
- Which tanks have pressurized piping associated with them.

Visual/field observations are used to determine if any spills or overfills have occurred that have not been immediately cleaned up. The presence of product around the f ill pipe indicates a spill or overfill. Proper release detection methods can also be verified with field observations.

During the interviews, ask the facility if monthly inventory control along with annual tightness testing is used. If monthly inventory control is used, check the measuring stick for divisions of 1/8 inch. A field check of the entire facility can also be done to determine if any tanks may have gone unreported. Fillports and vent lines can indicate the existence of a UST.

Documents take up the largest portion of time during a UST inspection. Documents that should be reviewed include:

- Notifications for all UST systems
- Reports of releases including suspected releases, spills and overfills, and confirmed releases
- Initial site characterization and corrective action plans
- Notifications before permanent closure

- Corrosion expert's analysis if corrosion protection is not used
- Documentation of operation of corrosion protection equipment
- Recent compliance with release detection requirements, including daily inventory sheets with the monthly reconciliation
- Results of site investigation conducted at the time of permanent closure.

Document retention rules also apply, so be sure to get all of the documents a facility may be required to keep. To determine if the implementing agency has been notified of all tanks, compare the notifications to general UST lists from the facility. Usually, the facility will keep a list of tanks separate from the notifications and tanks may appear on that list that do not appear on a notification form. Also, compare the notifications to tank lists required in other documents, like the Spill Prevention Control and Countermeasures Plan.

RCRA Non-Notifiers

Anytime an investigator is conducting an inspection, they should be aware of the possibility of a "non-notifier" under RCRA. A non-notifier is a facility who has either not notified the EPA or the delegated state of their hazardous waste activity or is managing hazardous waste in an unpermitted unit. The failure to notify may be intentional or the facility may not be aware that the unit should be regulated.

Two specific circumstances for an investigator to be aware of are as follows:

- a facility that is generating a hazardous waste and failed to notify of their generator status and obtain a RCRA I.D. Number.
- a facility that is disposing of hazardous waste in an on-site surface impoundment or landfill that has been determined by the facility to be either a non-hazardous solid waste management unit or an exempt wastewater treatment unit. (When inspecting the wastewater treatment plant, investigators should be aware that the RCRA exemption applies to tanks only. If wastewater meeting the definition of a hazardous waste is discharged into a surface impoundment, this unit is required to have a RCRA permit.)

B. Clean Air Act (CAA)

The Clean Air Act (CAA) is the legislative basis for air pollution control regulations. It was first enacted in 1955 and later in 1963, 1965, 1970, 1977, and 1990. The 1955 and the 1963 Amendments called for the abatement of air pollution through voluntary measures. The 1965 amendments gave Federal regulators the authority to establish automobile emission standards.

Basic Program

The CAA Amendments of 1970 significantly broadened the scope of the CAA, forming the basis for Federal and State air pollution control regulations. Section 109 of the 1970 Amendments called for the attainment of National Ambient Air Quality Standards (NAAQS, 40 CFR Part 50) to protect public health and welfare from the known or anticipated adverse effects of six air

pollutants (as of 1990 the standards were for small particulates, sulfur dioxide, nitrogen dioxide, carbon monoxide, ozone, and lead). The States were required to develop and submit to EPA implementation plans that were designed to achieve the NAAQS. These State Implementation Plans (SIPs) contained regulations that limited air emissions from stationary and mobile sources. They were developed and submitted to EPA on a continuing basis and became federally enforceable when approved.

Section 111 of the 1970 Amendments directed EPA to develop standards of performance for new stationary sources. These regulations, known as New Source Performance Standards (NSPS, 40 CFR Part 60), limited air emissions from subject new sources. The standards are pollutant and source specific.

Section 112 of the 1970 amendments directed EPA to develop standards for hazardous air pollutants. These regulations, known as the National Emission Standards for Hazardous Air Pollutants (NESHAPs, t 40 CFR Part 61), limited hazardous air emissions from both new and existing sources.

The CAA Amendments of 1977 addressed the failure of the 1970 amendments to achieve the NAAQS by requiring permits for major new sources. The permit requirements were based on whether the source was located in an area that did not meet the NAAQS (non-attainment areas). The permit program for sources in attainment areas was referred to as the Prevention of Significant Deterioration (PSD) program.

The CAA Amendments of 1990 significantly expanded the scope of the CAA. Section 112 amendments have amended the NESHAP program with the new provisions called "Title III - Hazardous Air Pollutants." Title III listed 189 hazardous air pollutants (Appendix O) and required EPA to start setting standards for categories of sources that emit these pollutants within 2 years (1992) and finish setting all standards within 10 years. It also contains provisions for a prevention-of-accidental-releases program.

Section 211 of the CAA regulates any fuel or fuel additive for use in motor vehicles if the resulting emission would cause or contribute to air pollution that may reasonably be anticipated to endanger public health or welfare, or if the emission products would significantly impair any emission control device or system in general use. There are several provisions under CAA section 211 which regulate fuels such as gasoline, diesel fuel, and fuel additives.

The Federal tampering prohibition is contained in Section 203(a)(3) of the CAA, 42 U.S.C. 7522(a)(3). Section 203(a)(3)(A) of the CAA prohibits any person from removing or rendering inoperative any emission control device or element of design installed on or in a motor vehicle or motor vehicle engine prior to its sale and delivery to an ultimate purchaser. Section 203(a)(3)(A) also prohibits any person from knowingly removing or rendering inoperative any such device or element of design after such sale and delivery and the causing thereof.

Section 203(a)(3)(B) of the CAA prohibits any person from manufacturing, selling, offering for sale, or installing any part or component intended for use with, or as part of, any motor vehicle or motor vehicle engine where a principal effect of the part or component is to bypass, defeat, or render inoperative any device or element of design installed on or in a motor vehicle or

motor vehicle engine in compliance with regulations under this title, and where the person knows or should know that such part or component is being offered for sale or is being installed for such use.

Section 609 of the CAA Amendments of 1990 requires facilities that perform service on vehicle air conditioners to have recycling or recovery equipment and the technicians who use the equipment to be certified by an EPA-approved Section 609 program.

Evaluating Compliance

The following procedures are used to evaluate compliance with the Clean Air Act.

Before an onsite inspection, the documents listed below should be obtained from State or EPA files and reviewed to determine what regulations apply and what compliance problems may exist.

- The State air pollution control regulations contained in the SIP (State regulations and permits form the basis for the air compliance inspection and will vary from State to State).
- Title V operating permit/application; the State operating and construction permits.
- The most current emissions inventory (check for sources subject to SIP, NSPS, and NESHAPs requirements).
- The Volatile Organic Compound (VOC) and Hazardous Air Pollutant emissions inventory. (The VOC inventory may not be included in the emissions inventory, but reported separately under SARA Title III Form R submittal. More information on the former submittal is found in the Emergency Planning and Community Right-to-Know section.).
- The consent decrees/orders/agreements still in effect and related correspondence.
- The most recent inspection reports.
- The most recent monthly or quarterly Continuous Emission Monitoring/Continuous Opacity Monitoring (CEM/COM) reports.
- AIRS Facility Subsystem (AFS) reports.
- Process descriptions, flow diagrams, and control equipment for air emission sources.
- Facility plot plan that identifies and locates the air pollution emission points.
- The on-site inspection should include a review of the records and documents listed below:
  - Process operating and monitoring records to determine if permit requirements are being followed.
  - Fuel analysis reports (including fuel sampling and analysis methods) to determine if sulfur dioxide emission limits and/or other fuel requirements are being met.

- Reports of process/control equipment malfunctions causing reportable excess emissions (refer to SIP to determine reportable malfunctions and report requirements).
- Source test reports to determine if NSPS, NESHAPs, MACTs, and/or major sources have demonstrated compliance with emission standards.
- CEM reports to determine if NSPS and SIP reporting requirements are being met (reported emissions should be checked against raw data for accuracy, and reported corrective actions should be checked for implementation).
- CEMS/COMS certification tests (relative accuracy and calibration drift) to verify that performance specifications at 40 CFR Part 60, Appendix B, are met.
- Records and reports specified in SIP regulations, NSPS, NESHAP, and MACT subparts, and applicable permits.

The onsite inspection should also include the following:

- Visible Emission Observations (VEOs), by inspectors certified to read smoke within the last 6 months, to determine compliance with SIP, NSPS, or NESHAPs opacity limits (document non-compliance with EPA Method 9, 40 CFR Part 60, Appendix A).
- A check of real time CEM measurements to determine compliance SIP, NSPS, or NESHAPs limits (opacity CEM measurements can be compared against VEOs).
- A review of CEM/COM calibration procedures and frequency to determine if the zero/ span check requirements and analyzer adjustment requirements of 40 CFR Part 60 are being met.
- Observations of process and control equipment operating conditions to determine compliance with permit conditions (if no permit conditions apply, control equipment operating conditions can be compared to baseline conditions from stack tests or manufacturer's specifications for proper operation).
- Observation of control equipment operating conditions and review of equipment maintenance practices and records to determine proper operation of control equipment.
- When inspecting a fuel refinery or terminal and when time permits, the investigator should review records to assess compliance with fuel regulations under CAA section 11. Things to look for include compliance with the new reformulated gasoline
- requirements including Reid vapor pressure levels (during summer months only) and oxygenate levels of outgoing gasoline, the sulfur content of outgoing diesel fuel, and the lead level of unleaded gasoline leaving the refinery.
- When inspecting a facility with its own fleet of vehicles or garage, maintenance records for the vehicles should be reviewed to determine compliance with Section 203 of the CAA. A review of air conditioning repair/maintenance records should also be conducted to determine compliance with Section 609 of the CAA.

- A review of all sources to determine if existing, new, modified, or reconstructed sources have construction and operating permits required by SIP (note other process changes that may not require a permit but could affect emissions). For example:
  - Are there any boilers, stationary diesel engines (emergency generators, lift pumps), or waste gas boilers of any size? What are their capacities, when installed or altered?
  - Are there any incinerators for sludge, grease, grit, screenings, etc.? When were they installed or altered?
  - Are there any storage tanks storing any liquid except water? What are their capacities, when installed or altered?
  - Are there any solvent or gasoline tanks? What are their capacities, when installed or altered?
  - Are there any storage silos for storing solid particles (e.g., lime)? What are their capacities, when installed or altered?
  - Are there any air pollution control devices of the following types? When where they installed or altered?
- Odor control equipment (carbon adsorbers, scrubbers) on such equipment as sludge handling/storage tanks, pump stations, wet-wells, metering stations, grit screening, headworks building?
- Waste gas burners such as digester flares, boilers, etc.?
- Scrubbers on pH adjustment process or pretreatment equipment (usually HCl control)?
  - Is there any shop equipment of the following types? When was it installed or altered?
- Paint spray booths
- Shotblast booths, controlled (any size) or uncontrolled
- Solvent degreasers
  - Is there any wastewater or water treatment equipment designed to reduce Volatile Organic Compounds (VOCs), which may emit air contaminants, such as aeration basins, surface impoundments, air strippers, roughing filters, trickling filters, or oil/water separators? When was the equipment installed or altered?
  - At industrial/commercial wastewater and pretreatment facilities, are there any aeration basins, lagoons, or settling basins? When were they installed or altered?
  - At industrial/commercial treatment works, is there equipment used to dispense odor reducing/masking agents? When was it installed or altered?
  - At industrial/commercial treatment works, is there equipment used directly to manufacture fertilizers (including mixers, blenders, conveyors, etc.)? When was it installed or altered?

C. Safe Drinking Water Act (SDWA)

Basic Program

Public drinking water supply systems (i.e., that serve at least 25 people or have 15 service connections for at least 60 days per year) are regulated by the Safe Drinking Water Act (SDWA) Amendments of 1986. Public water systems are divided into two categories designated as community and noncommunity systems. A community system serves people year-round, whereas a noncommunity system serves people only for a portion of the time (e.g. hotels and campgrounds). Different requirements apply to each type of system. Different requirements also apply depending on whether the water supply source is surface water or groundwater. EPA sets standards [known as Maximum Contaminant Levels (MCLs) for the quality of water that can be served by public water systems. Public systems must sample their water periodically and report findings to the State (or EPA, if the State has not been delegated the authority to enforce the SDWA). The systems must notify consumers if they do not meet the standards or have failed to monitor or report. EPA is on a statutory schedule for promulgating a large number of new MCLs.

The Underground Injection Control (UIC) program was developed pursuant to the SDWA (Public Law 93-523), Part C—Protection of Underground Sources of Drinking Water (40 CFR Parts 124 and 144 through 148). The scope of the UIC program is the determination of the soundness of construction and operation of injection wells as they relate to the protection of all underground sources of drinking water. The UIC program regulates five classes of injection wells, summarized as follows:

Class I	Industrial, municipal, or hazardous waste disposal beneath the lowermost underground source of drinking water (USDW)
Class II	Oil and gas-related wells used for produced fluid disposal, enhanced recovery, hydrocarbon storage, etc.
Class III	Mineral extraction wells
Class IV	Hazardous or radioactive waste disposal above or into a USDW Class V Injection wells not included in Classes I through IV.

Evaluating Compliance

Monitoring requirements for water supply systems and whether the system can be reasonably expected to routinely provide safe potable water should be determined. Many facilities purchase their potable water supply from a nearby municipality. If no further treatment is provided (e.g., chlorination by the facility), the facility remains a "consumer" rather than becoming a "supplier," and consequently does not have the monitoring or reporting requirements that a supplier would have. Nevertheless, the facility does have a responsibility to ensure that their actions do not result in contamination of the municipal water supply (e.g., through cross-connection). The audit team should be alert to these possibilities.

Inspectors should:

- Verify public water system records of monitoring and reports of exceedances of MCLs
- Interview water system personnel to identify potential operations and maintenance problems
- Check for appropriate treatment systems, such as adequate disinfection
- Check for cross-connections to the water supply and distribution system
- Obtain water source, treatment, and service area information
- Verify that sample locations are appropriate and representative for each contaminant (i.e. sample collected in distribution system versus entry to distribution system)
- Verify that sampling techniques and procedures are appropriate for UIC inspections, the following should be reviewed:
- Current status of wells (active, abandoned, under construction repairs)
- Types of wastes discharged to wells
- UIC permit and permit conditions, if applicable
- Injection well construction
- Potential pathways of endangerment to Underground Sources of Drinking Water (USDWs)
- Protection of USDWs from endangerment
- Frequency and type of Mechanical Integrity Testing (MIT)
- Annular pressure
- Annular pressure monitoring
- Radioactive tracer surveys
- Installation methods for well plugging
- Remedial operation
- Applicability of land disposal restrictions to injection well operations
- Recordkeeping and evidence documentation
- Outlets for floor drains
- Connection to "dry" wells
- Evidence of surface ponding
- Presence of septic systems and/or leach fields

Several States and industries have requested approval of alternative mechanical integrity testing methods or variances to accommodate special local hydrogeological conditions, historical practices, or industry interests. Inspectors and field investigators should be cautioned to keep current with special permit conditions and the status of any pending approvals/denials of alternative mechanical integrity testing procedures and variances.

D. Toxic Substances Control Act (TSCA)

This section describes those specific aspects of toxic substances control that are addressed by the Toxic Substances Control Act (TSCA) and its associated rules and regulations (40 CFR Parts 702 through 799).

Basic Program

The regulation of toxins under TSCA is divided into two components for Agency enforcement program management purposes.

1. "Chemical control" covers enforcement aspects related to specific chemicals regulated under Section 6 of TSCA, such as Polychlorinated Biphenyls (PCBs), Chlorofluorocarbons (CFCs), and asbestos.

2. "Hazard evaluation" refers to the various recordkeeping, reporting, and submittal requirements specified in Sections 5, 8, 12, and 13 of TSCA; although, some elements of what might be termed "chemical control" are also addressed in these sections. Sections 12 and 13 of TSCA, which pertain to chemical exports and imports, respectively, will not be covered in this manual because of their special nature and unique requirements.

Prior to discussing TSCA activities at a facility, the investigator must present appropriate facility personnel with copies of two TSCA inspection forms:

1. Notice of Inspection—Shows purpose, nature, and extent of TSCA inspection.

2. TSCA Inspection Confidentiality Notice—Explains a facility's rights to claim information at the facility as TSCA Confidential Business Information.

Before leaving the site, two additional forms must be completed, as appropriate:

1. Receipt for Samples and Documents—Itemizes all documents, photos, and samples received by the investigator during the inspection.

2. Declaration of Confidential Business Information—Itemizes the information that the facility claims to be TSCA Confidential Business Information.

Evaluating Compliance

Chemical Control

Although the controlled substances most frequently encountered during multi-media investigations are PCBs, the investigator should determine if other regulated toxic substances are present at the facility. Currently these include metal working fluids (Part 747), fully halogenated chlorofluoroalkanes (40 CFR Part 762), and asbestos (40 CFR Part 763); additional toxic substances may be regulated in the future. Because the probability of finding PCBs and

PCB-items at the facility is greater than finding other TSCA-regulated substances, the following discussion is directed toward an evaluation of compliance with proper PCB and PCB-item handling procedures. If other TSCA-regulated substances are found, the investigator should consult the regulations for appropriate requirements.

Management of PCBs/PCB-items is regulated under 40 CFR Part 761. In general, these regulations address recordkeeping, marking and labeling, inspections, storage, and disposal.

Facilities that store and/or dispose of PCBs and PCB-items should have EPA-issued letters of approval that contain facility operating and recordkeeping requirements in addition to those specified in 40 CFR Part 761. The investigator must obtain a copy of these approvals and any subsequent notifications to evaluate facility compliance. The inspector should review Part 761.30 to identify uses of PCB transformers which are prohibited beginning October 1, 1990, but with effective dates extending to October 1, 1993. The inspector should also review the requirements found in Part 761.30 that allow the installation of PCB transformers for emergency use.

In general, the compliance evaluation includes obtaining and reviewing information from Federal, State, and local regulatory agency files; interviewing facility personnel regarding material handling activity; examining facility records and inspecting materials handling units. Specific investigation tasks include:

- Inspect all in-service electrical equipment, known or suspected of containing PCBs, for leaks or lack of proper marking. A similar inspection should also be made of any equipment that the facility is storing for reuse. Make certain that any remedial actions were quick and effective in the case of leaks, spills, etc.
- If the above equipment includes any PCB transformers or capacitors, make certain that all relevant prohibitions are being met, such as those involving enhanced electrical protection, as well as other requirements in the Use Authorization section of the PCB Rule. Make certain that any hydraulic or heat transfer systems suspected of containing PCB fluids have been properly tested.
- Determine whether the facility is involved with servicing PCB items or using/collecting/ producing PCBs in any manner. If so, make certain that the appropriate requirements of the PCB Rule are being met.
- Determine whether the facility is involved with either the storage or disposal of PCBs/PCB- items. Inspect all storage for disposal facilities for proper containment, leaking items, proper marking, dates/time limits, location, protection from elements, and other necessary requirements. If the facility disposes of PCBs, make certain that proper methods are being employed and that design and operation of disposal units is in accordance with regulatory requirements.
- Determine whether storage/disposal facilities are complying with the notification and manifesting requirements contained in Subpart K of the PCB Rule.
- Thoroughly review, for purposes of adequacy and regulatory compliance, all records and reports required by the PCB Rule including the following:

- Annual documents
- Inspection logs
- PCB transformer registration letters
- Manifests/certificates of destruction
- Test data
- Spill cleanup reports
- EPA-issued permits or letters of approval
- SPCC plan, if one is necessary
- Operating records
- Notification of PCB activity.

Hazard Evaluation

Establishing compliance with the various hazard evaluation aspects of TSCA is best accomplished through review and evaluation of the recordkeeping, reporting, and submittal data required by the various regulatory components of Sections 5 and 8. In general, Section 5 addresses new chemicals (i.e., those not on the TSCA Chemical Substances Inventory) and Section 8 addresses existing chemicals (i.e., those chemicals that are on the TSCA Chemical Substances Inventory).

Much of the information obtained and reviewed under these two sections of TSCA will be declared "TSCA Confidential Business Information" by company officials, and thus special security procedures must be followed during review and storage of the documents.

40 CFR Parts 703 through 723 should be consulted for an explanation of TSCA terms and definitions. The following list summarizes the different objectives for inspections of the key TSCA Sections 5 and 8 components.

1. Premanufacture Notification (PMN)

   a. Verify that all commercially manufactured or imported chemicals are on the TSCA Chemical Substances Inventory, are covered by an exemption, or are not subject to TSCA.

   b. Verify that commercial manufacture or import of new chemicals did not begin prior to the end of the 90-day review date, and not more than 30 days before the Notice of Commencement (NOC) date. If commercial manufacture or import has not begun, verify that no NOC has been submitted.

   c. Verify the accuracy and documentation of the contents of the PMN itself.

2. Research and Development (R&D) Exemption

a. Verify that the recordkeeping and notification requirements are being met for all R&D chemicals.

b. Verify that "Prudent Laboratory Practices" and hazardous data searches are adequately documented.

3. Test Marketing Exemption (TME)

a. Verify that the conditions spelled out in the TME application are being met, particularly with respect to dates of production, quantity manufactured or imported, number of customers and use(s).

b. Verify that the TME recordkeeping requirements are being met.

4. Low Volume Exemption (LVE) and Polymer Exemption (PE)

a. Verify that specific conditions of the exemption application are being met, and that all test data have been submitted.

b. For an LVE, verify that the 1,000-kg limit per 12-month period has not been exceeded. For a PE, ensure that the chemical structure and monomer composition(s) are accurate.

c. Verify that recordkeeping requirements for both LVEs and PEs are being met.

5. 5(e)/5(f) Order, Rule, or Injunction

a. Verify that all conditions of the order, rule, or injunction are being followed, including use of protective equipment, glove testing, training, and recordkeeping.

b. If a testing trigger is specified, verify production volume and status of testing activity.

6. Significant New Use Rule (SNUR)

a. Verify that no commercial production has occurred prior to the 90-day review date.

b. Verify that SNUR notices (i.e., Significant New Use Notices [SNUNs) have been submitted for all applicable manufactured, imported, or processed chemicals.

c. Verify technical accuracy of SNUN and completeness of required recordkeeping.

7. Bona Fide Submittals

Determine the commercial production (or import) status and R&D history of those bona fide chemicals not found on the confidential 8(b) inventory. Verify findings against applicable PMN, TME, and other exemption.

8. Section 8(a) Level A PAIR and CAIR Report

   a. Determine if Preliminary Assessment Information Rule (PAIR) and Comprehe nsive Assessment Information Rule (CAIR) reports have been submitted for all 8(a) Level A listed chemicals manufactured or imported by the facility.

   b. Verify the accuracy of submitted PAIR information, particularly the reported figures for total production volume and worker exposure levels.

   c. Verify the accuracy of submitted CAIR information and if the report meets the date specified in the regulation.

9. Section 8(b) Inventory Update Rule (IUR)

   a. Verify the accuracy of the information submitted in response to the IUR.

   b. Determine that required information was submitted by the deadline for all chemicals subject to IUR.

10. Section 8(c) Recordkeeping

    a. Determine if the facility has a Section 8(c) file and that allegations of significant health and environmental harm on record are properly filed and recorded.

    b. Determine that all applicable allegations have been recorded and filed.

    c. Determine if the facility has a written Section 8(c) policy and if the policy includes outreach to the employees.

11. Section 8(d) Reporting

    Determine if copies (or lists) of all unpublished health effects studies have been submitted by manufacturers, importers, and processors for any Section 8(d) listed chemical.

12. Section 8(e) Reporting

    a. Verify that all Section 8(e) substantial risk reports to the Agency were accurate and submitted within the required time frames.

b. Verify that all substantial risk incidents and/or test results have been reported to EPA.

c. Determine that the company has an adequate written policy addressing Section 8(e), and that it relieves employees of individual liability.

E. Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)

Basic Program

Pesticides are regulated by FIFRA and regulations promulgated pursuant to FIFRA. Under FIFRA, pesticide products must be registered by EPA before they are sold or distributed in commerce. EPA registers pesticides on the basis of data adequate to show that, when used according to label directions, they should not cause unreasonable adverse effects on human health or the environment. States have primary enforcement responsibility for FIFRA.

To ensure that previously registered pesticides meet current scientific and regulatory standards, in 1972 Congress amended FIFRA to require the "reregistration" of all existing pesticides.

Evaluating Compliance

The following list is used in conjunction with specific storage/use/disposal requirements found on pesticide labels. FIFRA requires a written Notice of Inspection and written Receipt for Samples collected.

- Determine types and registration status of all pesticides produced, sold, stored, and used at the facility, particularly if any are restricted or experimental use pesticides.
- Determine use(s) of each pesticide.
- Determine certification status of facility/handlers.
  - Verify who certifies facility/pesticide handlers (EPA, State, Department of Defense).
  - Determine if commercial or private applicator.
  - If restricted-use pesticides are used, check if pesticide applicators are authorized to use these pesticides.
  - Check expiration dates on licenses/certificates.
- Review applicable records.
  - Check previous inspection records and complaints.
  - Check application records.
  - Check restricted-use pesticides records (must be kept at least 2 years). Document suspected violations accordingly.
  - Check inventory records.

  - Check training records.
- Inspect storage, mixing/loading, and container disposal areas
  - Check bulk storage areas for compliance with Federal/State rules.
  - Check location, ventilation, segregation, shelter, and housekeeping of pesticide storage handling areas. Check security, fire protection, and warning signs, as may be required by State regulations.
  - Check mixing equipment/procedures for reducing handlers' exposures to pesticides.
  - Check for safety equipment/procedures/use.
  - Check container cleanup and disposal procedures.
- Pesticide waste disposal
  - Check to see that pesticides are disposed of in accordance with applicable label and RCRA requirements.
- Determine measures taken to ensure farm worker safety.
  - Check pesticide use records for re-entry time limit notation.
  - Check pesticide use records for informing farmer(s) or warning workers and/or posting fields.
- Observe actual pesticide application.
  - Observe mixing/loading and check calculations for proper use dilution.
  - Observe when spray is turned on/off with respect to ends of field.
  - Watch for drift or pesticide mist dispersal pattern.
  - Note direction of spraying pattern and trimming techniques.
  - Record wind speed and direction, air temperature, and relative humidity.
  - Observe application with respect to field workers, houses, cars, power lines, and other obstacles.
  - Determine if applicator and assisting personnel are wearing safety gear required by the label.

F. Emergency Planning and Community Right- to-Know Act (EPCRA)

Basic Program

The Emergency Planning and Community Right-To-Know Act of 1986 is a free-standing law contained within the Superfund Amendments and Reauthorization Act (SARA) of 1986. EPCRA is also commonly known as SARA Title III. EPCRA requires dissemination of information to State and community groups and health professionals on chemicals handled at regulated facilities.

An EPCRA inspection verifies that the facility owner/operator has notified State and local agencies of regulated activities; has submitted information to specific State and local agencies; and has prepared and submitted all other required reports.

Evaluating Compliance

Emergency Planning (Sections 301 through 303)

EPA promulgated regulations that identify extremely hazardous substances and the levels to be regulated under EPCRA. The inspector should determine whether the facility is subject to EPCRA regulation. If the facility does meet the requirements, the inspector should verify whether the facility owner/operator:

- Notified the State emergency response agency and the local emergency planning committee that the facility is regulated under EPCRA.
- Designated a facility emergency coordinator to assist the local emergency planning committee in the planning process.
- Notified the local emergency planning committee of the emergency coordinator's identity.

Emergency Notification (Section 304)

The owner/operator of a facility subject to EPCRA must immediately report releases of hazardous substances above the reportable quantity. Substances subject to this requirement are the extremely hazardous substances listed in 40 CFR Part 355 and hazardous listed in 40 CFR Part 302. The inspector should verify whether an immediate notification (within 15 minutes) was made to the:

- State emergency response commission
- Local emergency planning committee
- National Response Center

Community Right-to-Know Requirements (Sections 311 through 312)

Manufacturing facilities subject to the Occupational Safety and Health Act (OSHA) Hazardous Communication regulation (29 *CFR* Part 1910) are required to prepare Material Safety Data Sheets (MSDS) for each hazardous chemical handled at the facility. OSHA revised its Hazardous Communication Regulation, effective September 23, 1987, to require that MSDSs be prepared by nonmanufacturing facilities. The inspector should verify that the facility owner/ operator has sent the following to the State emergency response commission, the local emergency planning committee, and the local fire department:

- MSDSs or a list of chemicals covered by MSDSs found at the facility above the threshold planning quantity (40 CFR Part 370 Subpart B)
- An annual inventory (Tier 11 Form) of hazardous chemicals found at the facility above the threshold planning quantity (40 CFR Part 370 Subpart D).

Toxic Chemical Release Reporting (Section 313)

Covered facilities (40 CFR Part 372.22) that manufacture, process, or otherwise use certain chemicals above specified amounts must annually report releases to the environment. The

inspector should determine whether the facility owner/operator is required to submit this annual report (Form R). The following criteria are applied to determine if the facility is required to report:

- The facility has the equivalent of 10 or more full-time employees.
- The facility is in SIC codes:
  - 10 (except 1011, 1081, and 1094)
  - 12 (except 1241)
  - 20 through 39
  - 4911, 4931, or 4939 (limited to facilities generating power for consumer use by combusting coal and/or oil)
  - 4953 (limited to RCRA Subtitle C facilities) o 5169 and 5171
  - 7389 (limited to facilities engaged in solvent recovery services)
- The facility manufactured or processed in excess of 25,000 pounds or used in any other manner 10,000 pounds or more of the chemicals listed on the Toxic Release Inventory (TRI). The list of TRI chemicals can be found in the current year's reporting instructions.

G. Pollution Prevention

Basic Program

EPA is developing an Agency-wide policy for pollution prevention. Present authorities were established in the 1984 Hazardous and Solid Waste Amendments to RCRA (Section 3002). The October 1990 Pollution Prevention Act established pollution prevention as a national priority. The September 16, 1998, Executive Order 13101, Section 403, Federal Facility Compliance.

Evaluating Compliance

EPA has developed a policy regarding the role of inspectors in promoting waste minimization (OSWER directory number 9938.10). As stated in the policy, to evaluate compliance, the Inspector should:

- Check hazardous waste manifests for a correctly worded and signed waste minimization certification.
- Determine whether this certification was manually signed by the generator or authorized representative.
- Confirm that a waste minimization program is in place by requesting to see a written waste minimization plan, or requesting that the plan be described orally, or requesting that evidence of a waste minimization program be demonstrated. The inspector can, and should, visually check for evidence of a "program in place" onsite.
- Check the Biennial Report and/or Operating record of generators and TSDFs, as appropriate. These documents should contain descriptions of waste minimization

progress and a certification statements. If known omissions, falsifications, or misrepresentations on any report or certification are suspected, criminal penalties may apply and the case should be referred for criminal investigation.

- Check any waste minimization language included in the facility's permits, any enforcement order, and settlement agreements. Verify that waste minimization requirements are being satisfied.

The policy also states that the inspector should promote waste minimization by:

- Being familiar with, recommending, and distributing waste minimization literature.
- Referring the facility to the appropriate technical assistance program for more specific or technical information.
- Providing limited, basic advice to the facility of obvious ways they can minimize their waste. This advice should be issued in an informal manner with the caveat that it is not binding in any way and is not related to regulatory compliance.

The multi-media inspection team can also document cross-media transfers of wastestreams, that can result in false claims of waste minimization. For example, a facility could treat a solvent wastewater stream in an air stripper that has no air pollution control devices. On paper, the amount of sol vent discharged to a land disposal unit or sewer system could show a reduction, but the pollutants are going into the air, possibly without a permit. Another example would be a facility claiming a reduction in hazardous waste generated because the waste steam was delisted.

Appendix AR – National Multimedia Screening Inspection Worksheet

GENERAL INFORMATION

1. Inspector(s) Name _____ 2. Date _____

3. Facility Name/Address

4. Facility Contact(s)/Title(s)

5. Description of Facility Operations

SIC Code _____

Number of Employees _____

Operating Schedule

Major Products/Production Capacity

RCRA

Observations

1. Does the facility generate anything that looks like waste material that might contain hazardous constituents?

2. If so, describe what the facility says regarding the RCRA regulatory status of the waste material and their rational for such determination. (e.g., have they made a RCRA waste identification and what was that determination? Have they determined the waste to be exempt from regulation and why?

3. Describe the process that generates the waste material.

4. Do you see any containers of hazardous waste, land disposal units, lagoons, treatment units? Approximately how many?

5. Were any of the units that contain or handle hazardous wastes (containers, berms, dikes, tanks, piping, impoundments, etc.) in poor condition, unmarked, opened, leaking, cracked, corroded, or in a condition that would allow the release or potential release of hazardous

wastes? If yes, describe unit(s). Any actual or evidence of past releases observed? If so, describe waste (i.e., liquid, sludge, etc.) unit(s), and location.

6. Does the facility operate a boiler or industrial furnace which burns hazardous wastes? Was there any incineration of hazardous waste on-site?

7. Was there any evidence of spills, leaks, or discharges of hazardous wastes? If so, provide location and description.

Interview Questions/Records Review

1. If the facility is a generator of hazardous waste was there a notification of hazardous waste activity? What is the quantity (kilograms/month) of hazardous wastes produced? How are they produced?

2. What is the EPA Identification Number?

3. What was the basis (i.e. test, knowledge of process and waste) for determining if the facility did or did not produce or handle hazardous wastes? Who made the determination?

UST

Observations

1. Are there any underground storage tanks?_____

2. Approximately how many? What are the contents? (Wastes, virgin petroleum, or chemicals)

_____

_____

_____

3. What type of leak detection is used? When was it last used?

_____

_____

_____

4. Is there any evidence of leaks, spills, broken piping, broken fill/vent lines, or leaking pump joints or valves? Provide location and description.

_____

_____

_____

Interview Questions/Records Review

1. If the tanks are for virgin petroleum or chemicals (not wastes), are they registered with the state? Date of registration? Date of tank(s) installation?

_____

_____

_____

SPCC

Observations

1. Does the facility have the capacity to store oil either in above or below ground tanks? How many gallons? Does any tank have a capacity of more than 660 gallons in a single tank or does the facility have a capacity of more than 1320 gallons in a number of tanks or a capacity of more than 42,000 gallons below the ground?

2. What type of secondary containment is used at the facility? Were there any deficiencies in the secondary containment (cracks, broken, dikes left open)? Is it adequate to contain the entire contents of the largest tank?

Interview Questions/Records Review

1. Does the facility have a certified (signed by a P.E.) plan? When was it last updated?

2. Has there been any major changes to oil storage at the facility since the last modification of the plan?

WETLANDS

Observations

1. Are there any wet areas near the facility with wetland-type vegetation (cattails, rushes, sedges) that have been disturbed by waste disposal, ditching, or filling?

Interview Questions/Records Review

1. Does the facility have a federal section 404 permit or any state or local permit authorizing the fill?

FIFRA

Observations

1. Does the facility produce pesticides?_____

2. Is the facility applying pesticides?_____

3. Where are the pesticides stored?

_____

_____

_____

Interview Questions/Records Review

1. If the facility produces pesticides what is the establishment's registration number?

_____

_____

_____

2. If the facility is applying pesticides what is the registration number of the pesticides?

_____

_____

_____

AIR

Observations

1. Is there any asbestos on-site? _____

2. Is the facility undergoing or has the facility undergone any renovations or demolitions during the last 18 months which involve the removal or disturbance of asbestos-containing materials? Approximately how much asbestos (square feet or linear feet) was removed?

_____

_____

_____

3. Does the facility have any coating or printing operations? Does the facility use any paints or organic solvents? What, if any, type of air pollution control is used? Was it operating?

_____

_____

_____

4. Were there any odors? What process was the source of the odors? Describe the odors.

_____

_____

_____

5. Were there any visible (opaque smoke) emissions? What process was the source? Was there any fugitive (not from a stack) emissions? Was the air pollution control equipment, if any, operating? Describe source.

Interview Questions/Records Review

1. If asbestos was removed was notification provide to the State and EPA?

2. If the facility has coating or printing operations are they water based or organic solvent based?

3. Does the facility handle/emit any of the National Emission Standards for Hazardous Air Pollutants (NESHAP) chemicals other than asbestos (mercury, beryllium, vinyl chloride, benzene, arsenic, radionuclides)? Describe process.

4. Has the facility added new or expanded existing processes in the last two years? Was it permitted by EPA of the State?

TSCA-PCBs

Observations

1. Did the facility have or does it have any PCB electrical equipment? What equipment (type and quantity) is on-site?

2. Does the facility have a PCB equipment storage area for disposal or reuse? Describe the storage area (i.e. concrete pad, walls, roof, curbs).

3. Are there any labels/markings on the PCB equipment?

4. Is there any leaking PCB electrical equipment? Describe.

5. Does the facility have any hydraulic systems? Any leaking?

Interview Questions/Records Review

1. If the facility has PCB electrical equipment was it tested? What were the test results?

2. If the facility has any hydraulic systems when were they tested for PCBs? What were the test results?

WATER-NPDES

Observations

1. Does the facility use water in its manufacturing process?

2. Does the facility discharge to a stream, municipal sewer, or use subsurface disposal?

3. What process(es) generate wastewater? Is the wastewater treated? Is the effluent clear? Does the treatment plant appear to be maintained (look for rust, dry basins, abandoned equipment, etc.)?

4. Where does the storm water drain to?

5. Where do floor drains discharge?

Interview Questions/Records Review

1. How is the treatment plant's sludge disposed? How is it tested?

EPCRA

Interview Questions/Records Review

1. Were there any chemical releases in excess of the reportable Superfund quantities (see below)? Who was provided the notification? Was it oral or written?

2. Does the facility manufacture, process, or use any toxic chemicals in a quantity greater than 10,000 lbs./yr.? Identity them. Are any of them section 313 chemicals[36]?

3. If the answer to question 2 is yes, has the facility submitted the toxic chemical release form (R)?

4. Does the facility have the Material Safety Data Sheets on-site and were they submitted to the State Emergency Response Commission (SERC) and/or the Local Emergency Planning Committee (LEPC)?

5. Has the facility submitted the Emergency and Hazardous Chemical Inventory forms to the LEPC and SERC?

[36] The chemicals subject to these requirements can be found in EPA publication number 560/4-92-011, January 1992, "Title III, List of Lists".

SDWA-UIC

Observations

1. Are there any discharges other than sanitary waste (i.e. industrial wastes) into or onto (including drain fields) the ground? Is an on-site septic disposal system used? Describe the discharges and disposal system.

Interview Questions/Records Review

1. Does the facility have or has it had any wells (dug, drilled or driven), dry wells, leachfields, or septic systems? Did they receive(d) commercial or industrial waste (liquid and/or solid), cooling water, or drainage from roof drains, floor drains, or parking lots? If yes, give a description.

2. Does the facility have a permit?

3. What is the current status of wells (active, abandoned, under construction, repairs)?

4. If the wells are inactive what was the date they were last used?

SDWA-PWS

Interview Questions/Records Review

1. What is the facility's source of drinking water? Does the facility have a private well? How many people does it serve?

2. Is the water sampled and analyzed for contaminants? Are the results reported to the state or EPA?

ENVIRONMENTAL ASSESSMENT

1. Is there any evidence of environmental impacts that haven't been addressed? Possible examples include:

- additional evidence of spills, leaks
- vegetation damage in the surrounding area
- odors in the surrounding neighborhood
- neighborhood covered with "dusts"
- poor water quality in streams near the facility.

2. Were there situations of possible excessive occupational exposure that should be referred to OSHA?

Office of Enforcement and Compliance Assurance

INSPECTION MANUAL

NPDES COMPLIANCE INSPECTION MANUAL

Number: OECA-MANL-2017-001-RO
[1/20/2017]
U.S. Environmental Protection Agency

U.S. Environmental Protection Agency Office of Enforcement & Compliance Assurance Controlled Document	
STANDARD OPERATING PROCEDURE	
Title: NPDES Compliance Inspection Manual	
Effective Date: 1/20/2017	**Number:** OECA-MANL-2017-001-RO
Author	
Name: <AUTHOR> Title: <TITLE> Office: Signature:	Date:
Approvals	
Name: <AUTHOR> Title: <TITLE> Office: Signature:	Date:
Name: <AUTHOR> Title: <TITLE> Office: Signature:	Date:
Name: <AUTHOR> Title: <TITLE> Office: Signature:	Date:
Name: <AUTHOR> Title: <TITLE> Office: Signature:	Date:
Name: David Meredith Title: Quality Assurance Manager Office: OC Signature:	Date:

Revision History

This table shows changes to this controlled document over time. The most recent version is presented in the top row of the table. Previous versions of the document are maintained by the OECA Document Control Coordinator.

History	Effective Date
NPDES Compliance Inspection Manual Revision 1	1/20/2017