It is anticipated that as a result of the requirement that all CAFOs have a duty to apply, there will be a large number of CAFOs applying for NPDES permits. Some of these operations represent a greater risk to water quality than others. In order for the permit writer to prioritize NPDES permit writing activities based on the risk to water quality, Section G is being proposed to add to Form 2B as a screening mechanism. Those facilities without buffers, setbacks, or conservation tillage potentially pose a greater risk to water quality; therefore the permit writer could use this information to develop and issue NPDES permits to these facilities on an expedited basis.

VIII. What Changes to the Feedlot Effluent Limitations Guidelines Are Being Proposed?

A. Expedited Guidelines Approach

EPA has developed today's proposed regulation using an expedited rulemaking process which relies on communication between EPA, the regulated community, and other stakeholders, rather than formal data and information gathering mechanisms. At various stages of information gathering, USDA personnel, representatives of industry and the national trade associations, university researchers, Agricultural Extension agencies, States, and various EPA offices and other stakeholders have presented their ideas, identified advantages and disadvantages to various approaches, and discussed their preferred options.

EPA encourages full public participation in commenting on these proposals.

B. Changes to Effluent Guidelines Applicability

1. Who is Regulated by the Effluent Guidelines?

The existing effluent guidelines regulations for feedlots apply to operations with 1,000 AU and greater. EPA is proposing to establish effluent guidelines requirements for the beef, dairy, swine, chicken and turkey subcategories that would apply to any operations in these subcategories that are defined as a CAFO under either the two-tier or three-tier structure. Also as discussed in detail in Section VII.B.3, EPA is also requesting comment on an option under which te effluent guidelines proposed today would not be applicable to facilities under 1,000 AU. Under this approach, AFOs below this threshold would be permitted based on an alternate set of effluent guidelines, or the best professional judgment of the permit writer. After evaluating public comments EPA may decide to consider this option. At that time EPA would develop and make available for comment an analysis of why it is appropriate to promulgate different effluent guidelines requirements or no effluent guidelines for CAFOs that have between 300 and 1,000 AU as compared to the effluent guidelines for operations with greater than 1,000 AU.

EPA also proposes to establish a new subcategory that applies to the production of veal cattle. Veal production is included in the beef subcategory in the existing regulation. However, veal production practices and wastewater and manure handling are very different from the practices used at beef feedlots; therefore, EPA proposes to establish a separate subcategory for veal.

Under the three-tier structure the proposed effluent guidelines requirements for the beef, dairy, swine, veal and poultry subcategories will apply to all operations defined as CAFOs by today's proposal having at least as many animals as listed below.

200 mature dairy cattle (whether milked or dry);
300 veal;
300 cattle other than mature dairy cattle or veal;
750 swine weighing over 55 pounds;
3,000 swine weighing 55 pounds or less;
16,500 turkeys; or
30,000 chickens.

Under the two-tier structure, the proposed requirements for the beef, dairy, swine, veal and poultry subcategories will apply to all operations defined as CAFOs by today's proposal having at least as many animals as listed below.

350 mature dairy cattle (whether milked or dry);
500 veal;
500 cattle other than mature dairy cattle or veal;
1,250 swine weighing over 55 pounds;
5,000 swine weighing 55 pounds or less;
27,500 turkeys; or
50,000 chickens.

EPA is proposing to apply the Effluent guidelines requirements for the beef, dairy, veal, swine, chicken and turkey subcategories, to all operations in these subcategories that are defined as CAFOs under either of today's proposed permitting scenarios. Operations designated as CAFOs are not subject to the proposed effluent guidelines.

EPA is proposing to rename the Effluent Guidelines Regulations, which is entitled Feedlots Point Source Category. Today's proposal changes the name to the Effluent Guidelines Regulation for the CAFOs Point Source Category. EPA is proposing this change for consistency and to avoid confusion between who is defined as a CAFO under Part 122 and whether the Effluent guidelines apply to the operation.

EPA is not proposing to revise the Effluent guidelines requirements or the applicability for the horses, sheep and lambs and ducks subcategories even though the definition of CAFO for these

subcategories is changing as described previously in Section VII. These sectors have not undergone the same level of growth and consolidation that the other livestock sectors have experienced in the past 25 years. In 1992, an estimated 260 farms in these sectors were potentially CAFOs based on size, and relatively few of these operations were expected to maintain horses or sheep in confinement. Finally, the CAFOs in these sectors have not been identified as significant contributors of wastewater pollutants that result in water quality impairment.

EPA has evaluated the technology options described in this section and evaluated the economic achievability for these technologies for all operations with at least as many animals listed above for both the two-tier and three-tier NPDES structures. The technology requirements for operations defined as CAFOs under the two-tier structure are the same requirements for operations defined as CAFOs under the three-tier structure. *Therefore for the purpose of simplifying this discussion and emphasizing the differences in technology requirements for the various technology options, the following discussion will not distinguish between the two CAFO definition scenarios.* For more discussion of the costs and differences in costs between the different CAFO definition scenarios, refer to Section X of this preamble or the EA. For discussion of the benefits achieved for the different technology options and scenarios, refer to Section XI of this preamble.

EPA proposes to make the Effluent guidelines and standards applicable to those operations that are defined as CAFOs as described previously under Section VII. EPA is not proposing to apply the Effluent guidelines to those operations that fall below the proposed thresholds but are still designated as CAFOs. As described in Section VII, EPA anticipates that few AFOs will be designated as CAFOs and that these operations will generally be designated due to site-specific conditions. Examples of these conditions could include, not capturing barnyard runoff which runs directly into the stream, or siting open stockpiles of manure inappropriately. EPA believes that establishing national technology based requirements for designated CAFOs is not efficient or appropriate because historically a small number of facilities has been designated and facilities which are designated in the future will be designated for a wide variety of reasons. EPA believes that a permit will best control pollutant discharges from those operations if it is based on the permit writer's best professional judgment and is tailored to address the specific problems which caused the facility to be designated.

EPA is proposing to make substantial changes to the applicability for chickens, mixed animal operations and immature animals as described below.

Chickens. The current regulations apply to chicken operations with liquid manure handling systems or continuous flow watering systems. Unlimited continuous flow watering systems have been replaced by more efficient systems for providing drinking water to the birds. Consequently, many state permitting authorities and members of the regulated community contend that the existing effluent guidelines do not apply to most broiler and laying hen operations, despite the fact that chicken production poses risks to surface water and groundwater quality from improper storage of dry manure, and improper land application. EPA is proposing to clarify the effluent guidelines to ensure coverage of

broiler and laying hen operations with dry manure handling. The proposed applicability is identical to the definition of chicken CAFOs described in Section VII.C.2.f. EPA is thus proposing to establish effluent guidelines for chicken operations that use dry manure handling systems regardless of the type of watering system or manure handling system used. EPA is using the term chicken in the regulation to include laying hens, pullets, broilers and other meat type chickens. See Section VII for more details on the proposed applicability threshold for chickens.

Mixed Animal Types. Consistent with the proposed changes to the definition of CAFO as described in Section VII.C.2.b, EPA is proposing to eliminate the calculation in the existing regulation that apply to mixed animals operations.

Immature Animals. EPA is proposing to apply technology based standards to swine nurseries and to operations that confine immature dairy cows or heifers apart from the dairy. EPA currently applies technology based standards to operations based on numbers of swine each weighing over 55 pounds. Modern swine production has a phase of production called a nursery that only confines swine weighing under 55 pounds. These types of operations are currently excluded from the technology based standards, but are increasing in both number and size. Therefore, EPA proposes to establish technology based standards to operations confining immature pigs. Under the two-tier structure EPA proposes to establish a threshold of 5,000 immature pigs or pigs weighing 55 pounds or less. Under the proposed three-tier structure operations that confine between 3,000 and 10,000 immature pigs could be defined as CAFOs and all operations with more than 10,000 immature pigs would be CAFOs. EPA also proposes to establish requirements for immature heifers when they are confined apart from the dairy, at either stand alone heifer operations similar in management to beef feedlots, or at cattle feedlots. Therefore EPA proposes to include heifer confinement off-site from the dairy under the beef feedlot subcategory, and today's proposed technology standards for beef feedlots would apply to those stand alone heifer operations defined as CAFOs. Also any feedlot that confines heifers along with cattle for slaughter is subject to the beef feedlot requirements.

EPA is proposing to establish a new subcategory for the effluent guidelines regulations which applies to veal operations. The existing regulation includes veal production in the beef cattle subcategory. EPA is proposing to create a distinct subcategory for veal operations because these operations use different production practices than other operations in the beef subcategory however, we are proposing to retain the sized threshold that pertained to veal while included in the beef subcategory. Veal operations maintain their animals in confinement housing as opposed to open outdoor lots as most beef feedlots operate. They also manage their manure very differently than typical operations in the beef cattle subcategory. Due in large part to the diet the animals are fed, the manure has a lower solids content and is handled through liquid manure handling systems, such as lagoons, whereas beef feedlots use dry manure handling systems and only collect stormwater runoff in retention ponds. EPA is proposing to define a veal CAFO as any veal operation which confines 300 veal calves or greater under the three-tier structure, or 500 veal calves or greater under two-tier structure.

C. Changes to Effluent Limitations and Standards

EPA is today proposing to revise BAT and new source performance standards for the beef, dairy, veal, swine and poultry subcategories. EPA is proposing to establish technology-based limitations on land application of manure to lands owned or operated by the CAFO, maintain the zero discharge standard and establish management practices at the production area.

1. Current Requirements

The existing regulations, which apply to operations with 1,000 AU or greater, require zero discharge of wastewater pollutants from the production area except when rainfall events, either chronic or catastrophic cause an overflow of process wastewater from a facility designed, constructed and operated to contain all process generated wastewaters plus runoff from a 10-year, 24-hour event under the BPT requirements and a 25-year, 24-hour event under the BAT and NSPS requirements. In other words, wastewater and wastewater pollutants are allowed to be discharged as the result of a chronic or catastrophic rainfall event so long as the operation has designed, constructed and operated a manure storage and/or runoff collection system to contain all process generated wastewater, including the runoff from a specific rainfall event. The effluent guidelines do not set discharge limitations on the pollutants in the overflow.

2. Authority to Establish Requirements Based on Best Management Practices

The regulations proposed today establish a zero discharge limitation and include provisions requiring CAFOs to implement best management practices (BMPs) to prevent or otherwise contain CAFO waste to meet that limitation at the production area. The regulations also establish non-numeric effluent limitations in the form of other BMPs when CAFO waste is applied to land under the control of the CAFO owner or operator. For toxic pollutants of concern in CAFO waste, specifically cadmium, copper, lead, nickel, zinc and arsenic, EPA is authorized to establish BMPs for those pollutants under CWA section 304(e). EPA also expects reductions in conventional and nonconventional water pollutants as a result of BMPs. To the extent these pollutants are in the waste streams subject to 304(e), EPA has authority under that section to regulate them. EPA also has independent authority under CWA sections 402(a) and 501(a) and 40 CFR 122.44(k) to require CAFOs to implement BMPs for pollutants not subject to section 304(e). In addition, EPA has authority to establish non-numeric effluent limitations guidelines, such as the BMPs proposed today, when it is infeasible to establish numeric effluent limits. Finally, EPA is authorized to impose the BMP monitoring requirements under section 308(a).

Production Area

EPA has determined that the BMPs for the production area are necessary because the requirement of zero discharge has historically not been attained. As described in Section V, of this

preamble, there are numerous reports of discharges from CAFOs that are unrelated to storm events which would be less likely to occur if the proposed BMPs described below were required.

Section 304(e) provides that "[t]he Administrator, after consultation with appropriate Federal and State agencies and other interested persons, may publish regulations, supplemental to any effluent limitations specified under (b) and (c) of this section for a class or category of point sources, for any specific pollutant which the Administrator is charged with a duty to regulate as a toxic or hazardous pollutant under section 1317(a)(1) or 1321 of this title, to control plant site runoff, spillage or leaks, sludge or waste disposal, and drainage from raw material storage which the Administrator determines are associated with or ancillary to industrial manufacturing or treatment process within such class or category of point sources and may contribute significant amounts of such pollutants to navigable waters." § 304(e). There are studies showing the presence of a number of listed metals in animal manure. Numerous sources such as the American Society of Agricultural Engineers, and Universities such as North Carolina State University have acknowledged the presence of metals in manure. Metals are present in the manure because they are added or present in the animal feed. EPA has estimated metal loadings being applied to land before and after this regulation would take effect. Although the concentration of metals present in untreated manure are less than the limits for metals established in EPA's biosolids regulations (40 CFR Part 503), EPA still anticipates that there would be a substantial reduction in pollutant loadings reaching the edge of the field through use of the land application practices included in today's proposal. See the Development Document for more discussion.

EPA's authority to require these BMPs does not require a determination that the toxics present in CAFO waste are significant. The federal courts have held that EPA has extensive authority to carry out its duties under the Clean Water Act:

EPA is not limited by statute to the task of establishing effluent standards and issuing permits, but is empowered by section 501(a) of the Act to prescribe regulations necessary to carry out its functions under the Act. 33 U.S.C. § 1361(a). It is also clear that permissible conditions set forth in NPDES permits are not limited to establishing limits on effluent discharge. To the contrary, Congress has seen fit to empower EPA to prescribe as wide a range of permit conditions as the agency deems appropriate in order to assure compliance with applicable effluent limits. 33 U.S.C. § 1342(a)(2); see also id. § 1314(e). NRDC v. EPA, 822 F.2d 104, 122 (D.C. Cir. 1987).

This authority operates independent of section 304(e). EPA's authority under section 402(a)(2) to establish NPDES permit conditions, including BMPs, for any pollutant when such conditions are necessary to carry out the provisions of the statute has been further implemented through regulations at 40 CFR 122.44(k). Although a requirement to establish and implement BMPs of the type proposed in this regulation could be imposed on a case-by-case basis, EPA has decided to promulgate this requirement on a categorical basis for those facilities which are CAFOs by definition. In light of the more than twenty years of experience with the regulation of CAFOs and their failure to achieve the zero discharge limit originally promulgated, EPA has determined that certain management

practices are necessary to ensure that the zero discharge limit is actually met. The stated goal of the Clean Water Act is to eliminate the discharge of pollutants into the Nation's waters. CWA section 101(a)(1). EPA has determined that these BMPs, by preventing or controlling overflows, leaks or intentional diversions, are an important step toward that goal.

Finally, EPA has authority to impose monitoring and recordkeeping requirements under section 308 of the Act. As described below EPA is proposing to require that CAFOs periodically sample their manure and soils to analyze for nutrient content. This is necessary to both determine what is the appropriate rate to land apply manure and to ensure that the application rate is appropriate. The proposed rule would also require CAFOs to conduct routine inspections around the production area to ensure that automated watering lines are functioning properly, and to ensure that the manure level for liquid systems is not threatening a potential discharge. The CAFO would also maintain records that document manure application, including equipment calibration, volume or amount of manure applied, acreage receiving manure, application rate, weather conditions and timing of manure application, application method, crops grown and crop yields. These records will provide documentation that the manure was applied in accordance with the PNP and has not resulted in a discharge of pollutants in excess of the agricultural use. EPA has determined that these practices are necessary in order to determine whether an owner or operator of a CAFO is complying with the effluent limitation. Establishment and maintenance of records, reporting, and the installation, use and maintenance of monitoring equipment are all requirements EPA has the authority to impose. 33 U.S.C. § 1318(a).

Land Application Areas

For the land application areas of a CAFO, EPA is proposing a nonnumeric effluent limitation consisting of best management practices. The D.C. Circuit has concluded that "[w]hen numerical effluent limitations are infeasible, EPA may issue permits with conditions designed to reduce the level of effluent discharges to acceptable levels." NRDC v. Costle, 568 F.2d 1369, 1380 (D.C. Cir. 1977); 40 C.F.R §122.44(k)(3). EPA has determined that it is infeasible to establish a numeric effluent limitation for discharges of land applied CAFO waste and has also determined that the proposed BMPs are the appropriate ones to reduce the level of discharge from land application areas.

The proposed BMPs constitute the effluent limitation for one wastestream from CAFOs. The statutory and regulatory definition of "effluent limitation" is very broad - "any restriction" imposed by the permitting authority on quantities, discharge rates and concentrations of a pollutant discharged into a water of the United States. Clean Water Act § 502(11), 40 CFR § 122.2. Neither definition requires an effluent limitation to be expressed as a numeric limit. Moreover, nowhere in the CWA does the term "numeric effluent limitation" even appear and the courts have upheld non-numeric restrictions promulgated by EPA as effluent limitations. See NRDC v. EPA, 656 F.2d 768, 776 (D.C. Cir. 1981) (holding that a regulation which allows municipalities to apply for a variance from the normal requirements of secondary sewage treatment is an "effluent limitation" for purposes of review under § 509(b): "[W]hile the regulations do not contain specific number limitations in all cases, their purpose is

to prescribe in technical terms what the Agency will require of section 1311(h) permit applicants."). Thus, the statutory definition of "effluent limitation" is not limited to a single type of restriction, but rather contemplates a range of restrictions that may be used as appropriate. Likewise, the legislative history does not indicate that Congress envisioned a single specific type of effluent limitation to be applied in all circumstances. Therefore, EPA has a large degree of discretion in interpreting the term "effluent limitation," and determining whether an effluent limitation must be expressed as a numeric standard. EPA has defined BMPs as "schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the United States." 40 CFR § 122.2. A BMP may take any number of forms, depending upon the problem to be addressed. Because a BMP must, by definition, "prevent or reduce the pollution of waters of the United States," the practices and prohibitions a BMP embodies represent restrictions consistent with the definition of an effluent limitation set out in CWA § 502(11).

Effluent limitations in the form of BMPs are particularly suited to the regulation of CAFOs. The regulation of CAFOs often consists of the regulation of discharges associated with storm water. Storm water discharges can be highly intermittent, are usually characterized by very high flows occurring over relatively short time intervals, and carry a variety of pollutants whose nature and extent varies according to geography and local land use. Water quality impacts, in turn, also depend on a wide range of factors, including the magnitude and duration of rainfall events, the time period between events, soil conditions, the fraction of land that is impervious to rainfall, other land use activities, and the ratio of storm water discharge to receiving water flow. CAFOs would be required to apply their manure and wastewater to land in a manner and rate that represents agricultural use. The manure provides nutrients, organic matter and micronutrients which are very beneficial to crop production when applied appropriately. The amount or rate at which manure can be applied to provide the nutrient benefits without causing excessive pollutant discharge will vary based on site specific factors at the CAFO. These factors include the crop being grown, the expected crop yield, the soil types, and soil concentration of nutrients (especially phosphorus), and the amount of other nutrient sources to be applied. For these reasons, EPA has determined that establishing a numeric effluent limitation guideline is infeasible.

EPA has determined that the various BMPs specified in today's proposed regulation represent the minimum elements of an effective BMP program. By codifying them into a regulation of general applicability, EPA intends to promote expeditious implementation of a BMP program and to ensure uniform and fair application of the baseline requirements. EPA is proposing only those BMPs which are appropriate on a nationwide basis, while giving both States and permittees the flexibility to determine the appropriate practices at a local level to achieve the effluent limitations. The BMP's (described below) that are included in the proposed technology options are necessary to ensure that manure and wastewater are utilized for their nutrient content in accordance with agricultural requirements for producing crops or pastures. EPA also believes that the proposed regulations represent an appropriate and efficient use of its technical expertise and resources that, when exercised

at the national level, relieves state permit writers of the burden of implementing this aspect of the Clean Water Act on a case-by-case basis.

3. Best Practicable Control Technology Limitations Currently Available (BPT)

EPA is proposing to establish BPT limitations for the beef, dairy, swine, veal chicken and turkey subcategories. There are BPT limitations in the existing regulations which apply to CAFOs with 1,000 AU or more in the beef, dairy swine and turkey subcategories. BPT requires that these operations achieve zero discharge of process wastewater from the production area except in the event of a 10-year, 24-hour storm event. EPA is proposing to revise this BPT requirement and to expand the applicability of BPT to all operations defined as CAFOs in these subcategories including CAFOs with fewer than 1,000 AU.

The Clean Water Act requires that BPT limitations reflect the consideration of the total cost of application of technology in relation to the effluent reduction benefits to be achieved from such applications. EPA considered two options as the basis for BPT limitations.

Option 1. This option would require zero discharge from a facility designed, maintained and operated to hold the waste and wastewater, including storm water, from runoff plus the 25-year 24-hour storm event. Both this option and Option 2 would add record keeping requirements and practices that ensure this zero discharge standard is met. As described in Section V there are numerous reports of operations discharging pollutants from the production area during dry weather. The reason for these discharges varies from intentional discharge to poor maintenance of the manure storage area or confinement area. EPA's cost models reflect the different precipitation and climatic factors that affect an operations ability to meet this requirement; see Section X and the Development Document for further details.

Option 1 would require weekly inspection to ensure that any storm water diversions at the animal confinement and manure storage areas are free from debris, and daily inspections of the automated systems providing water to the animals to ensure they are not leaking or spilling. The manure storage or treatment facility would have to be inspected weekly to ensure structural integrity. For liquid impoundments, the berms would need to be inspected for leaking, seepage, erosion and other signs of structural weakness. The proposal requires that records of these inspections would be maintained on-site, as well as records documenting any problems noted and corrective actions taken. EPA believes these inspections are necessary to ensure proper maintenance of the production area and prevent discharges apart from those associated with a storm event from a catastrophic or chronic storm.

Liquid impoundments (e.g., lagoons, ponds and tanks) that are open and capture precipitation would be required to have depth markers installed. The depth marker indicates the maximum volume that should be maintained under normal operating conditions allowing for the volume necessary to

contain the 25-year, 24-hour storm event. The depth of the impoundment would have to be noted during each week's inspection and when the depth of manure and wastewater in the impoundment exceeds this maximum depth, the operation would be required to notify the Permit Authority and inform him or her of the action will be taken to address this exceedance. Closed or covered liquid impoundments must also have depth markers installed, with the depth of the impoundment noted during each week's inspection. In all cases, this liquid may be land applied only if done in accordance with the permit nutrient plan (PNP) described below. Without such a depth marker, a CAFO operator may fill the lagoons such that even a storm less than a 25-year, 24-hour storm causes the lagoon to overflow, contrary to the discharge limit proposed by the BPT requirements.

An alternative technology for monitoring lagoon and impound meat levels is remote sensors which monitor liquid levels in lagoons or impoundments. This sensor technology can be used to monitor changes in liquid levels, either rising or dropping levels, when the level is changing rapidly can trigger an alarm. These sensors can also trigger an alarm when the liquid level has reached a critical level. The alarm can transmit to a wireless receiver to alert the CAFO owner or operator and can also alert the permit authority. The advantages of this type of system is the real time warning it can provide the CAFO owner or operator that his lagoon or impoundment is in danger of overflowing. It can provide the CAFO operator an opportunity to better manage their operations and prevent catastrophic failures. These sensors are more expensive than depth markers; however, the added assurance they provide in preventing catastrophic failures may make them attractive to some operations.

Option 1 would require operations to handle dead animals in ways that prevent contributing pollutants to waters of the U.S. EPA proposes to prohibit any disposal of dead animals in any liquid impoundments or lagoons. The majority of operations have mortality handling practices that prevent contamination of surface water. These practices include transferring mortality to a rendering facility, burial in properly sited lined pits, and composting.

Option 1 also would establish requirements to ensure the proper land application of manure and other process wastes and wastewaters. Under Option 1 land application of manure and wastewater to land owned or operated by the CAFO would have to be performed in accordance with a PNP that establishes application rates for manure and wastewater based on the nitrogen requirements for the crop. EPA believes that application of manure and wastewater in excess of the crop's nitrogen requirements would increase the pollutant runoff from fields, because the crop would not need this nitrogen, increasing the likelihood of it being released to the environment.

In addition, Option 1 includes a requirement that manure be sampled at least once per year and analyzed for its nutrient content including nitrogen, phosphorus and potassium. EPA believes that annual sampling of manure is the minimum frequency to provide the necessary nutrient content on which to establish the appropriate rate. If the CAFO applies its manure more frequently than once per year, it may choose to sample the manure more frequently. Sampling the manure as close to the time of application as practical provides the CAFO with a better measure of the nitrogen content of the

manure. Generally, nitrogen content decreases through volatilization during manure storage when the manure is exposed to air.

The manure application rate established in the PNP would have to be based on the following factors: (1) the nitrogen requirement of the crop to be grown based on the agricultural extension or land grant university recommendation for the operation's soil type and crop; and (2) realistic crop yields that reflect the yields obtained for the given field in prior years or, if not available, from yields obtained for same crop at nearby farms or county records. Once the nitrogen requirement for the crop is established the manure application rate would be determined by subtracting any other sources of nitrogen available to the crop from the crop's nitrogen requirement. These other sources of nitrogen can include residual nitrogen in the soil from previous applications of organic nitrogen, nitrogen credits from previous crops of legumes, and crop residues, or applications of commercial fertilizer, irrigation water and biosolids. Application rates would be based on the nitrogen content in the manure and should also account for application methods, such as incorporation, and other site specific practices.

The CAFO would have to maintain the PNP on-site, along with records of the application of manure and wastewater including: (1) the amount of manure applied to each field; (2) the nutrient content of manure; (3) the amount and type of commercial fertilizer and other nutrient sources applied; and (4) crop yields obtained. Records must also indicate when manure was applied, application method and weather conditions at the time of application.

While Option 1 would require manure to be sampled annually, it would not require soil sampling and analysis for the nitrogen content in the soil. Nitrogen is present in the soil in different forms and depending on the form the nitrogen will have different potential to move from the field. Nitrogen is present in an organic form from to the decay of proteins and urea, or from other organic compounds that result from decaying plant material or organic fertilizers such as manure or biosolids. These organic compounds are broken down by soil bacteria to inorganic forms of nitrogen such as nitrate and ammonia. Inorganic nitrogen or urea may be applied to crop or pasture land as commercial fertilizer. Inorganic nitrogen is the form taken up by the plant. It is also more soluble and readily volatile, and can leave the field through runoff or emissions. Nitrogen can also be added to the soil primarily through cultivation of legumes which will "fix" nitrogen in the soil. At all times nitrogen is cycling through the soil, water, and air, and does not become adsorbed or built up in the soil in the way that phosphorus does, as discussed under Option 2. Thus, EPA is not proposing to require soil sampling for nitrogen. EPA would, however, require that, in developing the appropriate application rate for nitrogen, any soil residue of nitrogen resulting from previous contributions by organic fertilizers, crop residue or legume crops should be taken into account when determining the appropriate nitrogen application rate. State Agricultural Departments and Land Grant Universities have developed methods for accounting for residual nitrogen contributed from legume crops, crop residue and organic fertilizers.

Option 1 would also prohibit application of manure and wastewater within 100 feet of surface waters, tile drain inlets, sinkholes and agricultural drainage wells. EPA strongly encourages CAFOs to construct vegetated buffers, however, Option 1 only prohibits applying manure within 100 feet of surface water and would not require CAFOs to take crop land out of production to construct vegetated buffers. CAFOs may continue to use land within 100 feet of surface water to grow crops. Under Option 1, EPA included costs for facilities to construct minimal storage, typically three to six months, to comply with the manure application rates developed in the PNP. EPA included these costs because data indicate pathogen concentrations in surface waters adjacent to land receiving manure are often not significantly different from pathogen levels in surface waters near lands not receiving manure when the manure has been stored and aged prior to land application. EPA believes the 100 foot setback, in conjunction with proper manure application, will minimize the potential runoff of pathogens, hormones such as estrogen, and metals and reduce the nutrient and sediment runoff.

EPA is aware of concerns that the presence of tile drain inlets, sinkholes and agricultural drainage wells may be widespread in some parts of the country. This could effectively preclude manure based fertilization of large areas of crop land. EPA requests comment on the presence of such features in crop land and the extent to which a 100 foot setback around such features would interfere with land application of manure. EPA also requests comment on how it might revise the setback requirement to address such concerns and still adequately protect water quality.

EPA analysis shows application rates are the single most effective means of reducing runoff. Nevertheless, no combination of best management practices can prevent pollutants from land application from reaching surface waters in all instances; vegetated buffers provide an extra level of protection. Buffers are not designed to reduce pollutants on their own; proper land application and buffers work in tandem to reduce pollutants from reaching surface waters. Data on the effectiveness of vegetated buffers indicate that a 35 to 66 foot vegetated buffer (depending primarily on slope) achieves the most cost-effective removal of sediment and pollutants from surface runoff. However, EPA chose not to propose requiring operations to take land out of production and construct a vegetated buffer because a buffer may not be the most cost-effective application to control erosion in all cases. There are a variety of field practices that should be considered for the control of erosion. EPA encourages CAFOs to obtain and implement a conservation management plan to minimize soil losses, and also to reduce losses of pollutant bound to the soils.

Today's proposal requires a greater setback distance than the optimum vegetated buffer distance. Since EPA is not requiring the construction of a vegetated buffer, the additional setback distance will compensate for the loss of pollutant reductions in the surface runoff leaving the field that would have been achieved with a vegetated buffer without requiring CAFOs to remove this land from production.

EPA solicits comment on additional options to control erosion which would, in turn, reduce the amount of pollutants reaching waters of the U.S. The options for controlling erosion include: (1)

implementing one of the three NRCS Conservation Practice Standards for Residue Management: No-Till and Strip Till (329A), Mulch Till (329B), or Ridge Till (329C) in the state Field Office Technical Guide; (2) requiring a minimum 30% residue cover; (3) achieving soil loss tolerance or "T"; or (4) implementing of the Erosion and Sediment Control Management Measure as found in EPA's draft National Management Measures to Control Nonpoint Source Pollution from Agriculture. This measure is substantially the same as EPA's 1993 Guidance Specifying Management Measure for Sources of Nonpoint Pollution in Coastal Waters which says to:

"...Apply the erosion control component of a Resource Management System (RMS) as defined in the 1993 Field Office Technical Guide of the U.S. Department of Agriculture National Resources Conservation Service to minimize delivery of sediment from agricultural lands to surface waters, or design and install a combination of management and physical practices to settle the settleable solids and associated pollutants in runoff delivered from the contributing area for storms of up to and including a 10-year, 24- hour frequency."

Farmers entering stream buffers in the Conservation Reserve Program's (CRP) Continuous Sign- Up receive bonus payments, as an added incentive to enroll, include a 20 percent rental bonus, a $100 per acre payment up-front (at the time they sign up), and another bonus at the time they plant a cover. These bonus payments more than cover costs associated with enrolling stream buffers, (i.e., rents forgone for the duration of their 10 or 15 year CRP contracts, and costs such as seed, fuel, machinery and labor for planting a cover crop). The bonuses provide a considerable incentive to enroll stream buffers because the farmers receive payments from USDA well in excess of what they could earn by renting the land for crop production. Farmers can enter buffers into the CRP program at any time.

EPA may also consider providing CAFOs the option of prohibiting manure application within 100 feet or constructing a 35 foot vegetated buffer. EPA solicits comment on any and all of these options.

Option 2. Option 2 retains all the same requirements for the feedlot and manure storage areas described under Option 1 with one exception: Option 2 would impose a BMP that requires manure application rates be phosphorus based where necessary, depending on the specific soil conditions at the CAFO.

Manure is phosphorus rich, so application of manure based on a nitrogen rate may result in application of phosphorus in excess of crop uptake requirements. Traditionally, this has not been a cause for concern, because the excess phosphorus does not usually cause harm to the plant and can be adsorbed by the soil where it was thought to be strongly bound and thus environmentally benign. However, the capacity for soil to adsorb phosphorus will vary according to soil type, and recent observations have shown that soils can and do become saturated with phosphorus. When saturation occurs, continued application of phosphorus in excess of what can be used by the crop and adsorbed

by the soil results in the phosphorus leaving the field with storm water via leaching or runoff. Phosphorus bound to soil may also be lost from the field through erosion.

Repeated manure application at a nitrogen rate has now resulted in high to excessive soil phosphorus concentrations in some geographic locations across the country. Option 2 would require manure application be based on the crop removal rate for phosphorus in locations where soil concentrations or soil concentrations in combination with other factors indicate that there is an increased likelihood that phosphorus will leave the field and contribute pollutants to nearby surface water and groundwater. Further, when soil concentrations alone or in combination with other factors exceed a given threshold for phosphorus, the proposed rule would prohibit manure application. EPA included this restriction because the addition of more phosphorus under these conditions is unnecessary for ensuring optimum crop production.

Nutrient management under Option 2 includes all the steps described under Option 1, plus the requirement that all CAFOs collect and analyze soil samples at least once every 3 years from all fields that receive manure. EPA would require soil sampling at 3 year intervals because this reflects a minimal but common interval used in crop rotations. This frequency is also commonly adopted in nutrient management plans prepared voluntarily or under state programs. When soil conditions allow for manure application on a nitrogen basis, then the PNP and record keeping requirements are identical to Option 1. Permit nutrient plans would have to be reviewed and updated each year to reflect any changes in crops, animal production, or soil measurements and would be rewritten and certified at a minimum of once every five years or concurrent with each permit renewal. EPA solicits comment on conditions, such as no changes to the crops, or herd or flock size, under which rewriting the plan would not be necessary and would not require the involvement of a certified planner.

The CAFO's PNP would have to reflect conditions that require manure application on a phosphorus crop removal rate. The manure application rate based on phosphorus requirements takes into account the amount of phosphorus that will be removed from the field when the crop is harvested. This defines the amount of phosphorus and the amount of manure that may be applied to the field. The PNP must also account for the nitrogen requirements of the crop. Application of manure on a phosphorus basis will require the addition of commercial fertilizer to meet the crop requirements for nitrogen. Under Option 2, EPA believes there is an economic incentive to maximize proper handling of manure by conserving nitrogen and minimizing the expense associated with commercial fertilizer. EPA expects manure handling and management practices will change in an effort to conserve the nitrogen content of the manure, and encourages such practices since they are likely to have the additional benefit of reducing the nitrogen losses to the atmosphere.

EPA believes management practices that promote nitrogen losses during storage will result in higher applications of phosphorus because in order to meet the crops requirements for nitrogen a larger amount of manure must be applied. Nitrogen volatilization exacerbates the imbalance in the ratio of nitrogen to phosphorus in the manure as compared to the crop's requirement. Thus application of

manure to meet the nitrogen requirements of the crop will result in over application of phosphorus and the ability of the crops and soil to assimilate phosphorus will reach a point at which the facility must revise the PNP to reflect phosphorus based application rates. EPA solicits comment on additional incentives that can be used to discourage those manure storage, treatment, and handling practices that result in nitrogen volatilization.

Under both Option 1 (N) and Option 2 (P), the application of nitrogen from all sources may not exceed the crop nutrient requirements. Since a limited amount of nutrients can be applied to the field in a given year, EPA expects facilities will select the site-specific practices necessary to optimize use of those nutrients. Facilities that apply manure at inappropriate times run the risk of losing the value of nutrients and will not be permitted to reapply nutrients to compensate for this loss. Consequently crop yields may suffer, and in subsequent years, the allowable application rates will be lower. For these reasons, facilities with no storage are assumed to need a minimal storage capacity to allow improved use of nutrients.

Option 2 provides three methods for determining the manure application rate for a CAFO. These three methods are:

- Phosphorus Index
- Soil Phosphorus Threshold Level
- Soil Test Phosphorus Level

These three methods are adapted from NRCS' nutrient management standard (Standard 590), which is being used by States' Departments of Agriculture to develop State nutrient standards that incorporate one or a combination of these three methods. EPA is proposing to require that each authorized state Permit Authority adopt one of these three methods in consultation with the State Conservationist. CAFOs would then be required to develop their PNP based on the State's method for establishing the application rate. In those states where EPA is the permitting authority, the EPA Director would adopt one of these three methods in consultation with that State's Conservationist.

Phosphorus Index – This index assesses the risk that phosphorus will be transported off the field to surface water and establishes a relative value of low, medium, high or very high, as specified in §412.33. Alternatively, it may establish a numeric ranking. At the present time there are several versions of the P-Index under development. Many states are working on a P-Index for their state in response to the NRCS 590 Standard, and NRCS itself developed a P-Index template in 1994 and is in the process of updating that template at the present time. There are efforts underway in the scientific community to standardize a phosphorus index and assign a numeric ranking.

At a minimum the phosphorus index must consider the following factors:

- soil erosion
- irrigation erosion
- runoff class
- soil P test
- P fertilizer application rate
- P fertilizer application method
- organic P source application rate
- organic P source application method

Other factors could also be included, such as:

- subsurface drainage
- leaching potential
- distance from edge of field to surface water
- priority of receiving water

Each of these factors is listed in a matrix with a score assigned to each factor. For example, the distance from edge of field to surface water assigns a score to different ranges of distance. The greater the measured distance, the lower the score. Other factors may not be as straightforward. For example, the surface runoff class relates field slope and soil permeability in a matrix, and determines a score for this element based on the combination of these factors. The same kind of approach could also be used for the subsurface drainage class, relating soil drainage class with the depth to the seasonal high water table. The values for all variables that go into determining a P-Index can either be directly measured, such as distance to surface water, or can be determined by data available from the state, such as soil drainage class that is based on soil types found in the state and assigned to all soil types. Finally, each factor is assigned a weight depending on its relative importance in the transport of phosphorus.

When a P-Index is used to determine the potential for phosphorus transport in a field and the overall score is high, the operations would apply manure on a phosphorus basis (e.g., apply to meet the crop removal rate for phosphorus). When a P-Index determines that the transport risk is very high, application of manure would be prohibited. If the P-Index results in a rating of low or medium, then manure may be applied to meet the nitrogen requirements of the crop as described under Option 1. However, the CAFO must continue to collect soil samples at least every three years. If the phosphorus concentration in the soil is sharply increasing, the CAFO may want to consider managing its manure differently. This may include changing the feed formulations to reduce the amount of phosphorus being fed to the animals, precision feeding to account for nutrient needs of different breeds and ages of animals. It may also include changing manure storage practices to reduce nitrogen losses. There is a great deal of research on feed management, including potential effects on milk production when phosphorus in rations fed to dairy cows is reduced, and the cost savings of split sex and multistage diets and the addition of or adding the enzyme phytase to make the phosphorus more digestible by poultry and swine. Phytase additions in the feed of monogastrics have proven effective at increasing the ability of the animal to assimilate phosphorus and can reduce the amount of phosphorus excreted. Phytase use is also reported to increase bioavailability of proteins and essential minerals, reducing the need for costly supplemental phosphorus, and reducing necessary calcium supplements for layers. The CAFO may also consider limiting the application of manure. For example, the CAFO may apply manure to one field to meet the nitrogen requirements for that crop but not return to that field until the crops have assimilated the phosphorus that was applied from the manure application.

Phosphorus Threshold – This threshold which would be developed for different soil types is a measure of phosphorus in the soil that reflects the level of phosphorus at which phosphorus movement in the field is acceptable. Scientists are currently using a soluble phosphorus concentration of 1 part per million (ppm) as a measure of acceptable phosphorus movement. When the soil concentration of phosphorus reaches this threshold the concentration of phosphorus in the runoff would be expected to be 1 ppm. The 1 ppm value has been used as an indicator of acceptable phosphorus concentration because it is a concentration that has been applied to POTWs in their NPDES permits. An alternative phosphorus discharge value could be the water quality concentration for phosphorus in a given receiving stream.

States which adopt this method in their state nutrient management standard would need to establish a phosphorus threshold for all types of soils found in their state.

Use of the phosphorus threshold in developing an application rate allows for soils with a phosphorus concentration less than three quarters the phosphorus threshold to apply manure on a nitrogen basis. When soils have a phosphorus concentration between 3/4 and twice the phosphorus threshold then manure must be applied to meet the crop removal requirements for phosphorus. For soils which have phosphorus concentrations greater than twice the phosphorus threshold, no manure may be applied.

Soil Test Phosphorus – The soil test phosphorus is an agronomic soil test that measures for phosphorus. This method is intended to identify the point at which the phosphorus concentration in the soil is high enough to ensure optimum crop production. Once that concentration range (often reported as a "high" value from soil testing laboratories) is reached, phosphorus is applied at the crop removal rate. If the soil test phosphorus level reaches a very high concentration, then no manure may be applied. Most soils need to be nearly saturated with phosphorus to achieve optimum crop yields. The soil phosphorus concentration should take into account the crop response and phosphorus application should be restricted when crop yield begins to level off.

The soil test phosphorus method establishes requirements based on low, medium, high and very high soil condition, and applies the same restrictions to these measures as are used in the P-Index. States that adopt this method must establish the soil concentration ranges for each of these risk factors for each soil type and crop in their state.

EPA anticipates that in most states, the permit authority will incorporate the State's nutrient standard (590 Standard) into CAFO permits. For example, if the permit authority, in consultation with the State Conservationist, adopts a Phosphorus Index, then CAFO permits would include the entire P-Index as the permit condition dictating how the application rate must be developed. If a permit authority selects the Phosphorus Threshold, then the CAFO permits must contain soil concentration limitations that reflect phosphorus-based application, as well as the level at which manure application is prohibited.

Each State Conservationist, in consultation with land grant university scientists and the state, must develop a Phosphorus Index for that state by May 2001. EPA may consider eliminating the use of the soil phosphorus threshold level and the soil test phosphorus level as methods for determining the manure application rate for a CAFO and requiring the use of the state Phosphorus Index. Scientists studying phosphorus losses from agricultural lands are supporting the development and use of the Phosphorus Index since it combines the factors critical in determining risk of phosphorus rate and transport to surface waters, including the soil phosphorus threshold level, when developed. EPA is soliciting comment on this option.

Finally, under Option 2 EPA is proposing to require CAFOs that transfer manure off-site to provide the recipient of the manure with information as to the nutrient content of the manure and provide the recipient with information on the correct use of the manure. See Section VII.E.4, for a complete discussion of the requirements for off-site transfer of manure.

As discussed in Section VI, compliance costs for manure transfer assessed to the CAFO include hauling costs and record keeping. If the recipient is land applying the manure, the recipient is most likely a crop farmer, and the recipient is assumed to already have a nutrient management plan that considers typical yields and crop requirements. The recipient is also assumed to apply manure and wastes on a nitrogen basis, so the application costs are offset by the costs for commercial fertilizer

purchase and application. EPA assumes the recipient may need to sample soils for phosphorus, and costs for sampling identically to the CAFO, i.e. every three years. EPA has not accounted for costs that would result from limiting the amount or way recipients are currently using manure. EPA solicits comment on the impact to recipients who currently use manure and may have to change their practices as a result of this requirement. In cases where manure is received for alternative uses, the recipient is deemed to already maintain the appropriate records.

EPA solicits comments on whether there should be required training for persons that will apply manure. There are some states which have these requirements. Proper application is critical to controlling pollutant discharges from crop fields. Some states have establish mandatory training for persons that apply manure. EPA will consult with USDA on the possibility of establishing a national training program for manure applicators.

Rotational Grazing. At the request of the environmental community, EPA has investigated rotational grazing as an alternative to confinement-based livestock production. Any pasture or grazing operation is by definition not a form of confinement, therefore use of these practices are outside of the scope of these regulations.

Intensive rotational grazing is known by many terms, including intensive grazing management, short duration grazing, savory grazing, controlled grazing management, and voisin grazing management. This practice involves rotating livestock and poultry among several pasture subunits or paddocks, often on a daily basis, to obtain maximum efficiency of the pasture land.

Due to the labor, fencing, water, and land requirements for intensive rotational grazing, typically only small dairy operations with less than 100 head use this practice. Few beef feedlots practice intensive rotational grazing. Poultry on pasture is usually housed in a portable building or pen holding up to 100 birds that is moved daily; rarely are more than 1,000 birds in total raised in this manner. Swine have also been successfully raised on pasture, most frequently as a seasonal farrowing operation in combination with seasonal sheep or cow grazing. Climate and associated growing seasons make it very difficult for operations to use an intensive rotational grazing system throughout the entire year. Most dairy operations and beef feedlots that use rotational grazing typically operate between 3 and 9 months of the year, with 12 months most likely only in the southern states. Poultry on pasture are produced for about 6 months, and pigs are typically farrowed once per year.

Grazing systems are not directly comparable to confined feeding operations, as one system can not readily switch to the other. Intensive rotational grazing systems are reported to have advantages over confined feeding operations: reduced housing and feed costs, improved animal health, less manure handling, and more economic flexibility. Intensive rotational grazing also encourages grass growth and development of healthy sod, which in turn reduces erosion. In a good rotational system, manure is more evenly distributed and will break up and disappear from the surface faster.

Despite these advantages, studies do not indicate significant reductions of pathogens or nutrients in runoff to nearby streams as compared to manured fields. Rotational grazing systems may still require manure maintenance near watering areas and paths to and from the paddock areas. There are also limits to the implementation of intensive rotational grazing systems, which are highly dependent upon: available acreage, herd size, land resources, labor, water availability, proximity of pasture area to milking center for dairy operations, and feed storage capabilities. Grazing systems usually produce lower animal weight gain and milk production levels, provide limited manure handling options, and do not provide the level of biosecurity that confinement farms can obtain.

Proposed Basis for BPT Limitations. EPA is not proposing to establish BPT requirements for the beef, dairy, swine, veal and poultry subcategories on the basis of Option 1, because it does not represent the best practicable control technology. In areas that have high to very high phosphorus build up in the soils, Option 1 would not require that manure application be restricted or eliminated. Thus, the potential for phosphorus to be discharged from land owned or controlled by the CAFOs would not be controlled by Option 1. Consequently Option 1 would not adequately control discharges of phosphorus from these areas. Option 2 would reduce the discharge of phosphorus in field runoff by restricting the amount of phosphorus that may be applied to the amount that is appropriate for agricultural purposes or prohibiting the application of manure when phosphorus concentrations in the soil are very high and additional phosphorus is not needed to meet crop requirements.

EPA is proposing to establish BPT limitations for the beef, dairy, swine, veal and poultry subcategories on the basis of Option 2 with the exception that it is co-proposing options with and without the certification regulations for off-site land application of manure. EPA's decision to base BPT limitations on Option 2 treatment reflects consideration of the total cost of application of technology in relation to the effluent reduction benefits to be achieved from such application. Option 2 is expected to cost $549 million under the two-tier structure and achieve 107 million pounds of pollutant reductions for a total cost to pound ratio of $0.57. The three-tier structure is estimated to cost $551 for a total cost to pound ratio of $0.51.

The Option 2 technology is one that is readily applicable to all CAFOs. The production area requirements represent the level of control achieved by the majority of CAFOs in the beef, dairy, swine, poultry and veal subcategories. USDA and the American Society of Agricultural Engineers cite the 25-year, 24-hour storm as the standard to which storage structures should comply. This has been the standard for many years, and most existing lagoons and other open liquid containment structures are built to this standard. As described above, the land application requirements associated with Option 2 are believed to represent proper agricultural practice and to ensure that CAFO manure is applied to meet the requirements of the crops grown and not exceed the ability of the soil and crop to absorb nutrients.

EPA believes any of the three methods for determining when manure should be applied on a phosphorus basis would represent BPT. Each method has distinct advantages which, depending on the

circumstances, could make one method preferred over another. There has been considerable work done in this area within the past few years and this work is continuing. EPA believes that this proposed BPT approach provides adequate flexibility to allow states to develop an approach that works best for the soils and crops being grown within their state. Nonetheless, EPA will continue to work with soil scientists and may consider standardizing the factors included in the phosphorus index to develop a standard rating scale, for the purpose of CAFO requirements. EPA also solicits comment on whether there should be some EPA oversight or approval of the phosphorus method developed by the states. Specifically EPA solicits comment whether of EPA should establish standards that must be included in a phosphorus index. These standards may include specifying additional criteria which should be considered in the index, such as distance to surface water. EPA also seeks comment on whether it should establish minimum standards on how these criteria must be factored into a Phosphorus Index, such as specifying the weight to be assigned to the various criteria included in the Index and assigning the values for specific ranges for each criteria. EPA may consider establishing a minimum standard for the phosphorus threshold method for example requiring that at a minimum the phosphorus threshold be based on the soil phosphorus concentration that would result in a soluble phosphorus concentration in the runoff of 1 ppm. EPA may also consider establishing specific sampling protocols for collecting manure and soil samples and analyzing for nutrients.

CAFOs must also develop and implement a PNP that establishes the appropriate manure application rate. EPA believes the land application rates established in accordance with one of the three methods described in today's proposed regulation, along with the prohibition of manure application within 100 feet of surface water, will ensure manure and wastewater are applied in a manner consistent with proper agricultural use. EPA has included a discussion of how to develop a PNP in section VIII.C.6.

EPA believes that state sampling and analytical protocols are effective; however, soil phosphorus levels can vary depending on how the soil samples are collected. For example, a CAFO that surface-applies manure will deposit phosphorus in the surface layer of the soil and should collect soil samples from the top layer of soil. If this CAFO collects soil samples to a depth of several inches the analysis may understate the phosphorus concentrations in the soil. EPA solicits comments on the need to establish sampling protocols for soil sampling.

4. Best Control Technology for Conventional Pollutants (BCT)

In evaluating possible BCT standards, EPA first considered whether there are any candidate technologies (i.e., technology options); that are technologically feasible and achieve greater conventional pollutant reductions than the proposed BPT technologies. (Conventional pollutants are defined in the Clean Water Act as including: Total Suspended Solids (TSS), Biochemical Oxygen Demand (BOD), pH, oil and grease and fecal coliform.) EPA considered the same BAT technology options described below and their effectiveness at reducing conventional pollutants. EPA's analysis of pollutant reductions has focused primarily on the control of nutrients, nitrogen and phosphorus. However, the

Agency has also analyzed what the technology options can achieve with respect to sediments (or TSS), metals, and pathogens. Although livestock waste also contains BOD, EPA did not analyze the loadings or loadings reductions associated with the technology options for BOD. Thus, the only conventional pollutant considered in the BCT analysis is TSS. EPA identified no technology option that achieves greater TSS removals than the proposed BPT technologies (see the Technical Development Document). EPA does not believe that these technology options would substantially reduce BOD loads. There are therefore no candidate technologies for more stringent BCT limits. If EPA had identified technologies that achieve greater TSS reductions than the proposed BPT, EPA would have performed the two part BCT cost test. (See 51 FR 24974 for a description of the methodology EPA employs when setting BCT standards.) EPA solicits comment on the assumptions it used in considering BCT.

EPA is proposing to establish BCT limits for conventional pollutants equivalent to the proposed BPT limits.

5. Best Available Technology Economically Achievable (BAT)

EPA is considering six technology options to control discharges from CAFOs in the beef, veal and poultry subcategories, and seven technology options for the dairy and hog subcategories. All of the technology options include restrictions on land application of manure, best management practices (BMPs), inspections and record keeping for the animal confinement areas, and wastewater storage or treatment structures. The following table summarizes the requirements for each of the seven technology options. Note that a given technology option may include a combination of technologies

Table 8-1. Requirements Considered in the Technology Options

	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7
Zero Discharge w/ overflow when a 25-24 Design Standard is met	X	X	X	X	Cattle & Dairy		
Depth markers for lagoons	X	X	X	X	Cattle & Dairy	X	X
Annual Manure Testing	X	X	X	X	X	X	X
N-based PNP	X						
100' LA setback	X	X	X	X	X	X	X
P-based PNP (where necessary)		X	X	X	X	X	X
Soil Test - every 3yrs.		X	X	X	X	X	X
Zero discharge without any allowance for overflow					Swine & Poultry		

	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7
Hydrologic Link Assessment & Zero Discharge to Groundwater beneath Production Area			X	X			
Ambient Surface Water Sampling (N,P,TSS)				X			
Anaerobic Digestion w/power generation					Swine	Swine & Dairy	
Frozen/snow covered/saturated application prohibitions							X

X = All Subcategories

Option 1. This option is equivalent to Option 1 described under BPT Section VIII.3. Option 1 would require zero discharge from the production area and that liquid storage be designed, constructed and maintained to handle all process wastewater and storm water runoff from the 25-year, 24-hour storm event. In addition, Option 1 requires management practices to ensure that the production area (which includes manure and wastewater storage) is being adequately maintained.

Option 1 also would establish a requirement to develop a PNP which establishes the proper land application rate for manure and wastewater to meet the nitrogen requirements for the crops being grown by the CAFO and require a 100 foot setback from surface water, sinkholes, tile drain inlets and agricultural drainage wells.

Option 2. This option is equivalent to Option 2 described under BPT (section VII.3). Option 2 includes all of the requirements established under Option 1. However, Option 2 would further restrict the amount of manure that can be applied to crop land owned or controlled by the CAFO. The CAFO would be required to apply manure and wastewater at the appropriate rate taking into account the nutrient requirements of the crop and soil conditions. Specifically, Option 2 would require that manure be applied at crop removal rate for phosphorus if soil conditions warrant and, if soils have a very high level phosphorus build-up, no manure or wastewater could be applied to the crop land owned or controlled by the CAFO.

Option 3. Option 3 includes all the requirements for Option 2 and would require that all operations perform an assessment to determine whether the ground water beneath the feedlot and manure storage area has a direct hydrological connection to surface water. As described in Section VII, EPA has authority to control discharges to surface water through ground water that has a direct hydrological connection to surface water. A hydrological connection refers to the interflow and

exchange between surface impoundments and surface water through an underground corridor or ground water. EPA is relying on the permitting authority to establish the region-specific determination of what constitutes a direct hydrological link. Option 3 would require all CAFOs to determine whether they have a direct hydrological connection between the ground water beneath the production area and surface waters. If a link is established, the facility would have to monitor ground water up gradient and down gradient of the production area to ensure that they are achieving zero discharge to ground water. EPA has assumed that CAFOs would comply with the zero discharge requirement by installing liners of synthetic material beneath lagoons and ponds, and impervious pads below storage of dry manure stockpiles. EPA's costs for liners reflect both a synthetic liner and compacted clay to protect the liner and prolong its useful life.

CAFOs with a direct hydrologic link would be required to sample the groundwater from the monitoring wells (located up gradient and down gradient of the production area) at a minimum frequency of twice per year. These samples are necessary to ensure that pollutants are not being discharged through groundwater to surface water from the production area. The samples shall be monitored for nitrate, ammonia, total coliform, fecal coliform, Total Dissolved Solids (TDS) and total chloride. Differences in concentration of these pollutants between the monitoring well(s) located up gradient and down gradient of the production area are assumed to represent a discharge of pollutants and must be prevented. As noted below, coliforms are not necessarily good indicators of livestock discharges. Also, it is difficult to determine "concentrations" of coliforms as they are not necessarily evenly distributed in the way chemical contaminants generally are. EPA requests comment on technical concerns associated with including total and fecal coliforms in the groundwater monitoring and protection requirements and on ways to address such concerns.

Option 4. Option 4 includes all the requirements for Option 3 and would require sampling of surface waters adjacent to feedlots and/or land under control of the feedlot to which manure is applied. This option would require CAFOs to sample surface water both upstream and downstream from the feedlot and land application areas following a one half inch rain fall (not to exceed 12 sample events per year). The samples would be analyzed for concentrations of nitrogen, phosphorus and total suspended solids (TSS). EPA selected these pollutants because it believes these pollutants provide an adequate indication of whether a discharge is occurring from the operation. All sampling results would be reported to the permit authority. Any difference in concentration between the upstream and downstream samples would be noted. This monitoring requirement could provide some indication of discharges from the land application or feedlot areas.

EPA also considered requiring that pathogens and BOD_5 be analyzed in samples collected. EPA decided that this would not be practical, because sampling under Option 4 is linked to storm events which limits the ability to plan in advance for analysis of the samples and making arrangements for shipping samples to laboratories. Fecal coliform and BOD samples all have very short holding times before they need to be analyzed. Most CAFOs are located in rural areas with limited access to overnight shipping services and are probably not near laboratories that can analyze for these pollutants.

Further, fecal coliform and similar analytes that are typically used as indicators in municipal wastewater are not necessarily good indicators of livestock discharges. If CAFOs were required to monitor for pathogens which could indicate discharges of manure or CAFO wastewater, it would be better to require monitoring for fecal enterococci, or even specific pathogens such as salmonella, Giardia, and Cryptosporidium. However, the cost for analyzing these parameters is very high and the holding times for these parameters are also very short.

Furthermore, EPA determined pathogen analyses are also inappropriate because the pathogens in manure are found in areas without animal agriculture. For example *Enterobacter, Klebsiella, Bacillus cereus, Clostridium,* and *Listeria* are all naturally occurring soil and plant microorganisms and are found in soils that have never received manure. Pathogens may also be deposited onto land from wildlife. Thus, EPA concluded that requiring analysis for these pollutants was impractical at best and potentially very expensive.

Option 5. Option 5 includes the requirements established by Option 2 and would establish a zero discharge requirement from the production area that does not allow for an overflow under any circumstances. By keeping precipitation from contacting with the animals, raw materials, waste handling and storage areas, CAFOs could operate the confinement areas and meet zero discharge regardless of rainfall events. Option 5 includes the same land application requirements as Option 2, which would restrict the rate of manure and wastewater application to a crop removal rate for phosphorus where necessary depending on the specific soil conditions at the CAFO. Additionally, as in Option 2, application of manure and wastewater would be prohibited within 100 feet of surface water.

EPA considered Option 5 for the poultry, veal and hog subcategories, where it is common to keep the animals in total confinement, feed is generally maintained in enclosed hoppers and the manure and wastewater storage can be handled so as to prevent it from contacting storm water. EPA considered a number of ways a facility might meet the requirements of no discharge and no overflow. In estimating the costs associated with Option 5, EPA compared the total costs and selected the least expensive technology for a given farm size, geographic region, and manure management system. Costs also depend on whether the facility's PNP indicates land application must be based on nitrogen or phosphorus, and how many acres the facility controls. The technologies described below were used singularly or in combination to meet the requirements of Option 5.

Many facilities can achieve Option 5 by covering open manure and storage areas, and by constructing or modifying berms and diversions to control the flow of precipitation. EPA costed broiler and turkey operations for storage sheds sufficient to contain six months of storage. Some poultry facilities, particularly turkey facilities, compost used litter in the storage sheds, allowing recycle and reuse of the litter. EPA costed swine, veal, and poultry facilities which use lagoons or liquid impoundments for impoundment covers.

EPA believes that operations which have excess manure nutrients and use flush systems to move manure out of the confinement buildings will have an incentive to construct a second lagoon cell. A second storage or treatment cell should accomplish more decomposition of the waste and will allow flush water to be recycled out of the second cell or lagoon, thus reducing the addition of fresh water to the system. Reducing the total volume of stored waste reduces the risk of a catastrophic failure of the storage structure. In the absence of large volumes of water, facilities with an excess of manure nutrients will be able to transfer the excess manure off-site more economically due to a lower volume of waste needing to be hauled. Water reduction also results in a more concentrated product which would have a higher value as a fertilizer.

Covered systems substantially reduce air emissions, and help maintain the nutrient value of the manure. Covered systems also may benefit facilities by reducing odors emanating from open storage. This option also creates a strong incentive for facilities to utilize covered lagoon digesters or multistage covered systems for treatment. The use of covers will allow smaller and more stable liquid impoundments to be constructed. Finally, the use of covered impoundments encourages treatment and minimal holding times, resulting in pathogen die-off and reduction of BOD and volatile solids.

Other technologies can be effectively used at some facilities, such as conversion of flush systems to scrape systems, or by retrofit of slatted floor housing to V-shaped under house pits that facilitate solid liquid separation. Solids can be stored or composted in covered sheds, while the urine can be stored in small liquid impoundments.

In the event the facility has insufficient land to handle all nutrients generated, EPA evaluated additional nutrient management strategies. First, the manure could pass through solid separation, resulting in a smaller volume of more concentrated nutrients that is more effectively transported offsite. Second, land application could be based on the uppermost portion of a covered lagoon containing a more dilute concentration of nutrients. Data indicates much of the phosphorus accumulates in the bottom sludge, which is periodically removed and could be transported offsite for proper land application. Though many facilities report sludge removal of a properly operating lagoon may occur as infrequently as every 20 years, EPA assumed facilities would pump out the phosphorus and metals enriched sludge every three years. This is consistent with the ANSI/ASAE standards for anaerobic treatment lagoons (EP403.3 JUL99) that indicates periodic sludge removal and liquid drawdown is necessary to maintain the treatment volume of the lagoon. Third, swine and poultry farms can implement a variety of feeding strategies, as discussed under Option 2 (see Section VII.C.3). Feed management including phytase, multistage diets, split sex feeding, and precision feeding have been shown to reduce phosphorus content in the manure by up to 50%. This results in less excess nutrients to be transported offsite, and allows for more manure to be land applied at the CAFO.

EPA is aware of a small number of swine facilities that are potentially CAFOs and use either open lots or some type of building with outside access to confine the animals. EPA data indicate these types of operations are generally smaller operations that would need to implement different technologies

than those described above. CAFOs that provide outdoor access for the animals need to capture contaminated storm water that falls on these open areas. Open hog lots would find it difficult to comply with a requirement that does not allow for overflows in the event of a large storm. EPA costed these facilities to replace the open lots with hoop houses to confine the animals and storage sheds to contain the manure. Hoop structures are naturally ventilated structures with short wooden or concrete sidewalls and a canvas, synthetic, or reflective roof supported by tubes or trusses. The floor of the house is covered with straw or similar bedding materials. The manure and bedding is periodically removed and stored. The drier nature of the manure lends to treatment such as composting as well as demonstrating reduced hauling costs as compared to liquid manure handling systems.

EPA considered a variation to Option 5 that would require CAFOs to use dry or drier manure handling practices. This variation assumed conversion to a completely dry manure handling system for hogs and laying hens using liquid manure handling systems. In addition to the advantages of reduced water use described above, a completely dry system is more likely to minimize leaching to ground water and, where directly connected hydrologically to surface water, will also reduce loads to surface waters. For the beef and dairy subcategories EPA assumes that the liquid stream would be treated to remove the solids and the solids would be composted. It is not practical to assume beef and dairy operations can avoid the generation of liquid waste because operations in both subcategories tend to have animals in open areas exposed to precipitation resulting in a contaminated storm water that must be captured. Also dairies generate a liquid waste stream from the washing of the milking parlor.

Option 6. Option 6 includes the requirements of Option 2 and requires that large hog and dairy operations (hog operations and dairies with 2,000 AUs) would install and implement enclosed anaerobic digestion to treat their manure and use the captured methane gas for energy or heat generation. With proper management, such a system can be used to generate additional on-farm revenue. The enclosed system will reduce air emissions, especially odor and hydrogen sulfide, and potentially reduces nitrogen losses from ammonia volatilization. The treated effluent will also have less odor and should be more transportable relative to undigested manure, making offsite transfer of manure more economical. Anaerobic digestion under thermophilic or heated conditions would achieve additional pathogen reductions.

Option 7. Option 7 includes the requirements of Option 2 and would prohibit manure application to frozen, snow covered or saturated ground. This prohibition requires that CAFOs have adequate storage to hold manure for the period of time during which the ground is frozen or saturated. The necessary period of storage ranges from 45 to 270 days depending on the region. In practice, this may result in some facilities needing storage to hold manure and wastes for 12 months. EPA requests comment on whether there are specific conditions which warrant a national standard that prohibits application when the ground is frozen, snow covered or saturated.

6. Proposed Basis for BAT

BAT Requirements for the Beef and Dairy Subcategories. EPA is proposing to establish BAT requirements for the beef and dairy subcategories based on the same technology option. The beef subcategory includes stand-alone heifer operations and applies to all confined cattle operations except for operations that confine mature dairy cattle or veal. Under the two-tier structure, the BAT requirements would apply to any beef operation with 500 head of cattle or more. Under the three-tier structure, the BAT requirements for beef would apply to any operation with more than 1,000 head of cattle and any operation with 300 to 1,000 head which meets the conditions identified in section VII.B. 2 and 3 of this preamble.

EPA proposes to establish BAT requirements for dairy operations which meet the following definitions: under the two-tier structure, all dairy with 350 head of mature dairy cows or more would be subject to today's proposed BAT requirements. Under the three-tier approach any dairy with more than 700 head of mature dairy cows or 250 to 700 head of mature dairy cows which meets the conditions identified in section VII of this preamble would be subject to today's proposed BAT requirements.

EPA proposes to establish BAT requirements for the beef and dairy subcategories based on Option 3. BAT would require all beef and dairy CAFOs to monitor the ground water beneath the production area by drilling wells up gradient and down gradient to measure for a plume of pollutants discharged to ground water at the production area. A beef or dairy CAFO can avoid this ground water monitoring by demonstrating, to the permit writer's satisfaction, that it does not have a direct hydrological connection between the ground water beneath the production area and surface waters.

EPA proposes to require CAFOs in the beef and dairy subcategories to monitor their ground water unless they determine that the production area is located above ground water which has a direct hydrological connection to surface water. CAFOs would have to monitor for ammonia, nitrate, fecal coliform, total coliform, total chlorides and TDS. EPA selected these pollutants because they may be indicators of livestock waste and are pollutants of concern to ground water sources. If the down gradient concentrations are higher than the up gradient concentration this indicates a discharge which must be controlled. As discussed above, EPA requests comment on the inclusion of total and fecal coliforms among the required analytes. For operations that do not demonstrate that they do not have a direct hydrologic connection, EPA based the BAT zero discharge requirement on the installation of liners in liquid storage structures such as lagoons and storm water retention ponds and concrete pads for the storage of dry manure stockpiles.

Beef and dairy CAFOs must also develop and implement a PNP that is based on application of manure and wastewater to crop land either at a crop removal rate for phosphorus where soil conditions require it, or on the nitrogen requirements of the crop. EPA believes the land application rates established in accordance with one of the three methods described in today's proposed regulation, along with the prohibition of manure application within 100 feet of that surface water will ensure manure and wastewater are applied in a manner consistent with proper agricultural use. See

EPA's document entitled "Managing Manure Nutrients at Concentrated Animal Feeding Operations" for the detailed discussion of how a PNP is developed.

EPA believes that technology option 3 is economically achievable and represents the best available technology for the beef and dairy subcategories, and is therefore proposing this option as BAT for these subcategories. The incremental annual cost of Option 3 relative to Option 2 for these subcategories is $170 million pre-tax under the two-tier structure, and $1205 million pre-tax under the three tier structure. EPA estimated annual ground water protection benefits from the proposed requirements of $70-80 million. EPA estimates Option 3 for the beef and dairy subcategories will reduce loadings to surface waters from hydrologically connected ground water by 3 million pounds of nitrogen. To determine economic achievability, EPA analyzed how many facilities would experience financial stress severe enough to make them vulnerable to closure under each regulatory option. As explained in more detail in the Economic Analysis, the number of facilities experiencing stress may indicate that an option might not be economically achievable, subject to additional considerations. Under Option 2, no facilities in either the beef or dairy sectors were found to experience stress, while under Option 3, the analysis projects 10 beef and 329 dairy CAFOs would experience stress under the two-tier structure, and 40 beef and 610 dairy CAFOs would experience stress under the three-tier structure. Of these, EPA has determined that 40 beef operations are considered small businesses based on size standards established by the Small Business Administration. This analysis assumes that 76% of affected operations would be able to demonstrate that their ground water does not have a hydrological connection to surface water and would therefore not be subject to the proposed requirements. EPA projects the cost of making this demonstration to the average CAFO would be $3,000. EPA is aware that concerns have been raised about these cost estimates, and about its estimates of how many facilities would be able to avoid the groundwater monitoring and protection requirements on this basis. EPA requests comment on this analysis and on its proposed determination that Option 3 is economically achievable for the beef and dairy sectors.

EPA is not proposing to base BAT requirements for the beef and dairy subcategories on Option 2 because it does not as comprehensively control discharges of pollutants through ground water which has a direct hydrological connection with surface water. However, EPA is requesting comment on Option 2 as a possible basis for BAT in the beef and dairy subcategories. EPA notes that even under Option 2, permit writers would be required to consider whether a facility is located in an area where its hydrogeology makes it likely that the ground water underlying the facility is hydrologically connected to surface water and whether a discharge to surface water from the facility through such hydrologically connected ground water may cause or contribute to a violation of State water quality standards. In cases where such a determination was made by the permit writer, he or she would impose appropriate conditions to prevent discharge via a hydrologic connection would be included in the permit, The main difference between Option 2 and Option 3 is thus that under Option 3, the burden of proof would be on the facility to demonstrate that it does not discharge to ground water that is hydrologically connected to surface water, while under Option 2, ground water protection and monitoring requirements would only be included in the permit if there were an affirmative determination

by the permitting authority that such requirements were necessary to prevent a discharge of pollutants to surface waters via hydrologically connected ground water that may be sufficient to cause a violation of State water quality standards. Under today's proposal, the Option 2 approach to preventing discharges via hydrologically connected ground water would be used for the veal, swine and poultry subcategories. EPA requests comment on applying this approach to the beef and dairy subcategories as well.

EPA is not proposing to establish BAT requirements for the beef and dairy subcategories on the basis of Option 4 due to the additional cost associated with ambient stream monitoring and because the addition of in-stream monitoring does not by itself achieve any better controls on the discharges from CAFOs as compared to the other options. In-stream monitoring could be an indicator of discharges occurring from the CAFO; however, it is equally likely that in stream monitoring will measure discharges that may be occurring from adjacent non-CAFO agricultural sources. Through the use of commercial fertilizers these non-CAFO sources would likely be contributing the same pollutants being analyzed under Option 4. EPA has not identified a better indicator parameter which would isolate constituents from CAFO manure and wastewater from other possible sources contributing pollutants to a stream. Pathogen analysis could be an indicator if adjacent operations do not also have livestock or are not using manure or biosolids as fertilizer sources. However, as described earlier, EPA has concerns about the ability of CAFOs to collect and analyze samples for these pollutants because of the holding time constraints associated with the analytical methods for these parameters. Accordingly, EPA does not believe that specifying these additional in-stream monitoring BMP requirements would be appropriate; and would not be useful in ensuring compliance with the Clean Water Act. Moreover, in-stream monitoring would be a very costly requirement for CAFOs to comply with.

EPA is not proposing to establish BAT requirements for the beef and dairy subcategories on the basis of Option 5. Option 5 would require zero discharge with no overflow from the production area. Most beef feedlots are open lots which have large areas from which storm water must be collected; thus, it is not possible to assume that the operation can design a storm water impoundment that will never experience an overflow even under the most extreme storm. Stand alone heifer operations (other than those that are pasture-based) are configured and operated in a manner very similar to beef feedlots. Unlike the hog, veal and poultry subcategories, EPA is not aware of any beef operations that keep all cattle confined under roof at all times.

Dairies also frequently keep animals in open areas for some period of time, whether it is simply the pathway from the barn to the milk house or an open exercise lot. Storm water from these open areas must be collected in addition to any storm water that contacts food or silage. As is the case for beef feedlots, the runoff volume from the exposed areas is a function of the size of the area where the cattle are maintained, and the amount of precipation. Since the CAFO operator cannot control the amount of precipation, there always remains the possibility that an extreme storm event can produce enough rainfall that the resulting runoff would exceed the capacity of the lagoon.

EPA did consider a new source option for new dairies that would enforce total confinement of all cattle at the dairy. This new source option poses a barrier to entry for new sources, therefore, EPA assumes that this option if applied to existing sources would be economically unachievable. Furthermore, EPA did evaluate a variation of Option 5 that would apply to existing beef and dairy operations and would require the use of technologies which achieve a less wet manure. These technologies include solid-liquid separation and composting the solids. EPA is not proposing to establish BAT on the use of these technologies, but does believe these technologies may result in cost savings at some operations. Additionally, composting will achieve pathogen reductions. As described in section VIII.C.9., EPA is continuing to examine pathogen controls and may promulgate requirements on the discharge of pathogens. If EPA set limitations on pathogens, composting technology would likely become a basis for achieving BAT limits. EPA invites comment on composting and its application to dry beef and dairy manure.

For any operation that has inadequate crop land on which to apply its manure and wastewater, solid-liquid separation and composting could benefit the CAFO, as these technologies will make the manure more transportable. Drier manure is easier to transport; and therefore, EPA believes solid liquid separation and composting will be used in some situations to reduce the transportation cost of excess manure. In addition, composting is a value-added process that improves the physical characteristics (e.g., reduces odor and creates a more homogenous product) of the manure. It can also make the manure a more marketable product. As a result, a CAFO with excess manure may find it easier to give away, or even sell, its excess manure. EPA encourages all CAFOs to consider technologies that will reduce the volume of manure requiring storage and make the manure easier to transport.

Option 6, which requires anaerobic digestion treatment with methane capture, was not considered for the beef subcategory, but was considered for the dairy subcategory for treatment of liquid manure. Anaerobic digestion can only be applied to liquid waste. As described previously in Section VI, beef feedlots maintain a dry manure, yet they capture storm water runoff from the dry lot and manure stockpile. The storm water runoff is generally too dilute to apply digestion technology.

Most dairies, however, handle manure as a liquid or slurry which is suited to treatment through anaerobic digestion. EPA concluded that application of anaerobic digesters at dairies will not necessarily lead to significant reductions in the pollutants discharges to surface waters from CAFOs. An anaerobic digester does not eliminate the need for liquid impoundments to store dairy parlor water and barn flush water and to capture storm water runoff from the open areas at the dairy. Neither do digesters reduce the nutrients, nitrogen or phosphorus. Thus, basing BAT on digester technology would not change the performance standard that a production area at a CAFO would achieve and would not reduce or eliminate the need for proper land application of manure. Digesters were considered because they achieve some degree of waste stabilization and more importantly they capture air emissions generated during manure storage. The emission of ammonia from manure storage structures is a potentially significant contributor of nitrogen to surface waters. Covered anaerobic

digesters will prevent these emissions while the waste is in the digester, but the digester does not convert the ammonia into another form of nitrogen, such as nitrate, which is not as volatile. Thus as soon as the manure is exposed to air the ammonia will be lost. Operations may consider additional management strategies for land application such as incorporation in order to maintain the nitrogen value as fertilizer and to reduce emissions.

As mentioned above, the application of ambient temperature or mesophilic anaerobic digesters would not change the performance standard that a CAFO would achieve. EPA considered anaerobic digestion as a means to control pathogens. Thermophilic digestion which applies heat to the waste will reduce pathogens. As described in Section VIII.C.9. EPA is still evaluating effective controls for pathogens.

EPA is not proposing to base BAT requirements on Option 7 for the beef and dairy subcategories. Option 7 would prohibit manure application on saturated, snow covered or frozen ground. Pollutant runoff associated with application of manure or wastewater to saturated, snow covered or frozen ground is a site specific consideration, and depends on a number of site specific variables, including distance to surface water and slope of the land. EPA believes that establishing a national standard that prohibits manure or wastewater application is inappropriate because of the site specific nature of these requirements and the regional variability across the nation. This is described in Section VII.E.5.b, above. However, Section VII also explains that EPA is proposing to revise 40 CFR Part 122 to require the permit authority to include, on a case-by-case basis, restrictions on the application of CAFO waste to frozen, snow covered or saturated ground in CAFO permits. This permit condition should account for topographic and climatic conditions found in the state.

Requirements for the beef and dairy subcategories would still allow for an overflow in the event of a chronic or catastrophic storm that exceeds the 25-year, 24-hour storm. EPA believes this standard reflects the best available technology. Under the proposed revisions to Part 122, permits will require that any discharge from the feedlot or confinement area be reported to the permitting authority within 24 hours of the discharge event. The CAFO operator must also report the amount of rainfall and the approximate duration of the storm event.

BAT Requirements for the Swine, Veal and Poultry Subcategories. EPA is proposing to establish BAT requirements for the swine, veal and poultry subcategories based on Option 5. For the purpose of simplifying this discussion, the term poultry is used to include chickens and turkeys. Option 5 requires zero discharge of manure and process wastewater and provides no overflow allowance for manure and wastewater storage. Land application requirements for these operations would be the same as the requirements under Option 2.

EPA is proposing Option 5 because swine, veal and poultry operations can house the animals under roof and feed is also not exposed to the weather. Thus, there is no opportunity for storm water contamination. Broiler and turkey operations generate a dry manure which can be kept covered either

under a shed or with tarps. Laying hens with dry manure handling usually store manure below the birds' cages and inside the confinement building. Veal and poultry operations confine the animals under roof, thus there are no open animal confinement areas to generate contaminated storm water. Those operations with liquid manure storage can comply with the restrictions proposed under this option by diverting uncontaminated storm water away from the structure, and covering the lagoons or impoundments.

The technology basis for the poultry BAT requirements at the production area are litter sheds for broiler and turkey CAFOs, and underhouse storage for laying hens with dry manure handling systems. For laying hen CAFOs with liquid manure handling systems, EPA's technology basis is solid separation and covered storage for the solids and covered lagoons.

Laying hen farms may also have egg wash water from in-line or off-line processing areas. Only 10% of laying hen operations with fewer than 100,000 birds have on farm egg processing, while 35% of laying hen operations with more than 100,000 birds have on farm egg processing. The wash water is often passed through a settling system to remove calcium, then stored in above ground tanks, below ground tanks, or lagoons. Today's proposal is based on covered storage of the egg wash water from on-farm processing, to prevent contact with precipitation. The ultimate disposal of egg wash water is through land application which must be done in accordance with the land application rates established in the PNP. EPA believes the low nutrient value of egg washwater is unlikely to cause additional incremental costs to laying hen facilities to comply with the proposed land application requirements.

EPA assumes large swine operations (e.g., operations with more than 1,250 hogs weighing 55 pounds or greater) operate using total confinement practices. EPA based BAT Option 5 on the same approach described above of covering liquid manure storage. CAFOs can operate covered lagoons as anaerobic digesters which is an effective technology for achieving zero discharge and will provide the added benefits of waste stabilization, odor reduction and control of air emissions from manure storage structures. Anaerobic digesters also can be operated to generate electricity which can be used by the CAFO to offset operating costs.

Although Option 5 is the most expensive option for the hog subcategory, as shown on Table X.E.2(a), EPA believes this option reflects best available technology economically achievable because it prevents discharges resulting from liquid manure overflows that occur in open lagoons and pond. Similarly, the technology basis of covered treatment lagoons and drier manure storage is believed to reduce the likelihood of those catastrophic lagoon failures associated with heavy rainfalls. Option 5 also achieves the greatest level of pollutant reductions from runoff reaching the edge of the field. Non-water quality environmental impacts include reduced emissions and odor, with a concurrent increase in nitrogen value of the manure, however as mentioned previously, the ammonia concentration is not reduced and once the manure is exposed to air the ammonia will volatilize. Water conservation and recycling practices associated with Option 5 will promote increased nutrient value of the manure, reduced hauling costs via reduced water content, and less fresh water use.

The technology basis of Option 5, solid-liquid separation and storage of the solids, has the advantage of creating a solid fraction which is more transportable, thus hog CAFOs that have excess manure can use this technology to reduce the transportation costs.

EPA is aware of three open lot hog operations that have more than 1,250 hogs and there may be a small number of others, but the predominant practice is to house the animals in roofed buildings with total confinement. For open lot hog CAFOs, EPA is proposing to base BAT on the application of hoop structures as described above.

Veal operations use liquid manure management and store manure in lagoons. EPA has based BAT on covered manure and feed storage. The animals are housed in buildings with no outside access. Thus, by covering feed and waste storage the need to capture contaminated storm water is avoided.

In evaluating the economic achievability of Option 5 for the swine, veal and poultry subcategories, EPA evaluated the costs and impacts of this option relative to Option 2. For these subcategories, the incremental annual cost of Option 5 over Option 2 would be $110 million pre-tax under the two-tier structure, and $140 million pre-tax under the three-tier structure. Almost all of these incremental costs are projected to be in the swine sector. Since the majority of the costs are borne by the swine subcategory, EPA solicits comment on establishing BAT on the basis Option 5 for the only the veal and poultry subcategories, and establishing BAT on the basis of Option 2 that the swine subcategory. EPA projects that there would be no additional costs under the two-tier structure, and only very small additional costs under the three-tier structure for the veal and poultry subcategories to move from Option 2 to Option 5. Under Option 2, EPA estimates 300 swine operations and 150 broiler operations would experience stress under the two-tier structure, and 300 swine operations and 330 broiler operations would experience stress under the three-tier structure. Under Option 5 an additional 1,120 swine operations would experience stress under both the two-tier and three-tier structures. All affected hog operations have more than 1000 AU. None of these affected hog operations are small businesses based on the Small Business Administration's size standards. There would be no additional broiler operations experiencing stress under Option 5, and no veal, layer, or turkey operations are projected to experience stress under either Option 2 or Option 5. EPA did not analyze the benefits of Option 5 relative to Option 2. Under Option 2 operations are required to be designed, constructed and operated to contain all process generated waste waters, plus the runoff from a 25-year, 24-hour rainfall event for the location of the point source. Thus, the benefit of Option 5 over Option 2 would be the value of eliminating discharges during chronic or catastrophic rainfall events of a magnitude of the 25-year, 24-hour rainfall event or greater. Further benefit would be realized as a result of increased flexibility on the timing of manure application to land. By preventing the rainfall and run-off from mixing with wastewater, CAFOs would not need to operate such that land application during storm events was necessary.

EPA is not proposing Option 2 for these sectors. However, EPA notes that at the time of the SBREFA outreach process, removing the 25-year, 24-hour design standard for any sector was not

considered largely due to concern that a different design standard would lead to larger lagoons or impoundments. EPA staff explicitly stated this to the SERs and other member of the Panel. Although not extensively discussed, since it did not appear at that time to be an issue, retention of this standard was supported by both the SERs and the Panel. At that time, EPA was not planning to evaluate such an option because of the concern that this would encourage larger lagoons. Since the Panel concluded it outreach, EPA decided to evaluate, and ultimately propose removing this design standard for the veal, swine and poultry subcategories because of reports of lagoon failures resulting from rainfall and poor management. As mentioned previously, all of these sectors maintain their animals under roof eliminating the need to capture contaminated storm water from the animal confinement area. In addition, most poultry operations generate a dry manure, which when properly stored, under some type of cover, eliminates any possibility of an overflow in te event of a large storm. Therefore EPA believes that Option 5 technology which prevents the introduction of storm water into manure storage is achievable and represents Best Available Technology, without redesigning the capacity of existing manure storage units. However, EPA requests comment on retaining te 25-year, 24-hour storm design standard (and thus basing BAT on Option 2) for these sectors, consistent with its intention at the time of the SBREFA outreach process.

EPA is not proposing to base BAT for the swine, poultry and veal subcategories on Option 3, because EPA believes Option 5 is more protective of the environment. If operators move towards dry manure handling technologies and practices to comply with Option 5, there should be less opportunity for ground water contamination and surface water contamination through a direct hydrological connection. EPA strongly encourages any newly constructed lagoons or anaerobic digesters to be done in such a manner as to minimize pollutant losses to ground water. A treatment lagoon should be lined with clay or synthetic liner or both and solid storage should be on a concrete pad or preferably a glass-lined steel tank as EPA has included in its estimates of BAT costs. Additionally, Option 5 provides the additional non-water quality benefit of achieving reductions in air emissions from liquid storage systems. EPA estimates that the cost of complying with both Option 3 and 5 at existing facilities would be economically unachievable.

EPA believes the proposed technology basis for broilers, turkeys and laying hens with dry manure management will avoid discharges to ground water since the manure is dry and stored in such a way as to prevent storm water from reaching it. Without some liquid to provide a transport mechanism, pollutants cannot move through the soil profile and reach the ground water and surface water through a direct hydrological connection.

EPA is not proposing to base BAT on Option 4 for the same reasons described above for the beef and dairy subcategories.

EPA is not proposing to base BAT on Option 6, because EPA believes that the zero discharge aspect of the selected option will encourage operations to consider and install anaerobic digestion in situations where it will be cost effective.

As with beef and dairy, EPA is not proposing to base BAT for swine, veal and poultry on Option 7, but believes that permit authorities should establish restrictions as necessary in permits issued to CAFOs. Swine, veal and poultry operations should take the timing of manure application into account when developing the PNP. Any areas that could result in pollutant discharge from application of manure to frozen, snow covered or saturated ground should be identified in the plan and manure or wastewater should not be applied to those areas when there is a risk of discharge.

EPA solicits comment on the use of remote liquid level monitoring at livestock operations. As described above in Section VIII.C.3, this technology could provide advanced notification that levels are reaching a critical point, and corrective actions could then be taken. This technology does not prevent precipitation from entering the lagoon and does not prevent overflows, therefore EPA chose not to propose this technology as BAT for swine or veal operations. However, EPA solicits comments on applicability of this technology to livestock operations, especially at swine and veal as an alternative to covers on lagoons.

PNP Requirements

There are a number of elements that are addressed by both USDA's "Guidance for Comprehensive Nutrient Management Plans (CNMPs)" and EPA's PNP which would be required by the effluent guidelines and NPDES proposed rules and is detailed in the guidance document "Managing Manure Nutrients at Concentrated Animal Feeding Operations." EPA's proposed PNP would establish requirements for CAFOs that are consistent with the technical guidance published by USDA experts, but go beyond that guidance by identifying specific management practices that must be implemented. What follows is a brief description of what must be included in a PNP.

General Information. The PNP must have a Cover Sheet which contains the name and location of the operation, the name and title of the owner or operator and the name and title of the person who prepared the plan. The date (month, day, year) the plan was developed and amended must be clearly indicated on the Cover Sheet. The Executive Summary would briefly describe the operation in terms of herd or flock size, total animal waste produced annually, crop identity for the full 5 year period including a description of the expected crop rotation and, realistic yield goal. The Executive Summary must include indication of the field conditions for each field unit resulting from the phosphorus method used (e.g., phosphorus index), animal waste application rates, the total number of acres that will receive manure, nutrient content of manure and amount of manure that will be shipped off-site. It should also identify the manure collection, handling, storage, and treatment practices, for example animals kept on bedding which is stored in a shed after removal from confinement house, or animals on slatted floors over a shallow pull plug pit that is drained to an outdoor in-ground slurry storage inpoundment. Finally, the Executive Summary would have to identify the watershed(s) in which the fields receiving manure are located or the nearest surface water body. While the General Information section of a PNP would give a general overview of the CAFO and its nutrient management plan, subsequent sections would provide further detail.

Animal Waste Production. This subsection details types and quantities of animal waste produced along with manure nutrient sampling techniques and results. Information would be included on the maximum number of livestock ever confined and the maximum livestock capacity of the CAFO, in addition to the annual livestock production. This section would provide an estimate of the amount of animal waste collected each year. Each different animal waste source should be sampled annually and tested by an accredited laboratory for nitrogen, phosphorous, potassium, and pH.

Animal Waste Handling, Collection, Storage, and Treatment. This subsection details best management practices to protect surface and groundwater from contamination during the handling, collection, storage, and treatment of animal waste. A review would have to be conducted of potential water contamination sources from existing animal waste handling, collection, storage, and treatment practices. The capacity needed for storage would be calculated.

Feedlot runoff would have to be contained and adequately managed. Runoff diversion structures and animal waste storage structures would have to be visually inspected for: seepage, erosion, vegetation, animal access, reduced freeboard, and functioning rain gauges and irrigation equipment, on a weekly basis. Deficiencies based on visual inspections would have to be identified and corrected within a reasonable time frame. Depth markers would have to be permanently installed in all lagoons, ponds, and tanks. Lagoons, ponds, and tanks would have to be maintained to retain capacity for the 25-year, 24-hour storm event. Dead animals, required to be kept out of lagoons, would have to be properly handled and disposed of in a timely manner. Finally, an emergency response plan for animal waste spills and releases would have to be developed.

Land Application Sites. This subsection details field identification and soil sampling. County(ies) and watershed code(s) where feedlot and land receiving animal waste applications are located would be identified. Total acres of operation under the control of the CAFO (owned and rented) and total acres where animal waste will be applied would be included. A detailed farm map or aerial photo, to be included, would have to indicate: location and boundaries of the operation, individual field boundaries, field identification and acreage, soil types and slopes, and the location of nearby surface waters and other environmentally sensitive areas (e.g., wetlands, sinkholes, agricultural drainage wells, and aboveground tile drain intakes) where animal waste application is restricted.

Separate soil sampling, using an approved method, would have to be conducted every 3 years on each field receiving animal waste. The samples shall be analyzed at an accredited laboratory for total phosphorous. Finally, the phosphorous site rating for each field would have to be recorded according to the selected assessment tool.

Land Application. This subsection details crop production and animal waste application to crop production areas. Details of crop production would have to include: identification of all planned crops, expected crop yields and the basis for yield estimates, crop planting and harvesting dates, crop residue management practices, and nutrient requirements of the crops to be grown. Calculations used

to develop the application rate, including nitrogen credits from legume crops, available nutrients from past animal waste applications, and nutrient credits from other fertilizer and/or biosolids applications would have to be included.

Animal waste application rates cannot exceed nitrogen requirements of the crops. However, animal waste application rates would be limited to the agronomic requirements for phosphorous if the soil phosphorous tests are rated "high", the soil phosphorous tests are equal to 3/4, but not greater than twice the soil phosphorous threshold value, or the Phosphorous Index rating is "high." Finally, animal waste could not be applied to land if the soil phosphorous tests are rated "very high", the soil phosphorous tests are greater than twice the soil phosphorous threshold value, or the Phosphorous Index rating is "very high." In some cases, operators may choose to further restrict application rates to account for other limiting factors such as salinity or pH.

Animal wastes cannot be applied to wetlands or surface waters, within 100 feet of a sinkhole, or within 100 feet of water sources such as rivers, streams, lakes, ponds, and intakes to agricultural drainage systems (e.g., aboveground tile drain intakes, agricultural drainage wells, pipe outlet terraces). EPA requests comment on how serious would be the limitations imposed by these requirements. Manure spreader and irrigation equipment would have to be calibrated at a minimum once each year, but preferably before each application period. Finally, the date of animal waste application and calibration application equipment, and rainfall amounts 24-hours before and after application would be recorded.

Other Uses/Off-Site Transfer. The final required subsection for a PNP details any alternative uses and off-site transport of animal wastes. If used, a complete description of alternative uses of animal waste would have to be included. If animal wastes are transported off-site the following would have to be recorded: date (day, month, year), quantity, and name and location of the recipient of the animal waste.

Voluntary Measures. Many voluntary best management practices can be included within various subsections of a PNP. These voluntary best management plans are referenced in EPA's guidance document for PNP "Managing Manure Nutrients at Concentrated Animal Feeding Operations."

Annual Review and Revision. While a PNP is required to be renewed every 5 years (coinciding with NPDES permitting), an annual review of the PNP would have to occur and the PNP would b revised or amended as necessary.

The most likely factor which would necessitate an amendment or revision to a PNP is a change in the number of animals at the CAFO. A substantial increase in animal numbers (for example an increase of greater than 20%) would significantly increase the volume of manure and total nitrogen and phosphorous produced on the CAFO. Because of this, the CAFO will need to re-evaluate animal

waste storage facilities to ensure adequate capacity, and may need to re-examine the land application sites and rates.

A second reason which would require an amendment or revision to a PNP is a change in the cropping program which would significantly alter land application of animal waste. Changes in crop rotation or crop acreage could significantly alter land application rates for fields receiving animal waste. Also the elimination or addition of fields receiving animal waste application would require a change in the PNP.

Changes in animal waste collection, storage facilities, treatment, or land application method would require an amendment or revision to a PNP. For example, the addition of a solid-liquid separator would change the nutrient content of the various animal waste fractions and the method of land application thereby necessitating a revision in a PNP. Changing from surface application to soil injection would alter ammonia volatilization subsequently altering animal waste nutrient composition requiring a revision of land application rates.

When CAFOs Must Have PNPs. EPA proposes to allow two groups of CAFOs up to 90 days to obtain a PNP:

3. existing CAFOs which are being covered by a NPDES permit for the first time; or
4. existing CAFOs that are already covered under an existing permit which is reissued within 3 years from the date of promulgation of these regulations.

EPA proposes that all other existing CAFOs must have a PNP at the time permits are issued or renewed.

7. New Source Performance Standards

For purposes of applying the new source performance standards (NSPS) being proposed today, a source would be a new source if it commences construction after the effective date of the forthcoming final rule. (EPA expects to take final action on this proposal in December 2002, which is more than 120 days after the date of proposal – see 40 CFR 122.2). Each source that meets this definition would be required to achieve any newly promulgated NSPS upon commencing discharge.

In addition, EPA is proposing additional criteria to define "new source" that would apply specifically to CAFOs under Part 412. EPA intends that permit writers will consult the specific "new source" criteria in Part 412 rather than the more general criteria set forth in 40 CFR 122.29(b)(1). The other provisions of 40 CFR 122.29 continue to apply. EPA proposes to consider an operation as a new source if any of the following three criteria apply.

The definition of new source being proposed for Part 412 states three criteria that determine whether a source is a "new source."

First, a facility would be a new source if it is constructed at a site at which no other source is located. These new sources have the advantage of not having to retrofit the operation to comply with BAT requirements, and thus can design to comply with more stringent and protective requirements.

The second criterion for defining a new source would be where new construction at the facility "replaces the housing, waste handling system, production process, or production equipment that causes the discharge or potential to discharge pollutants at an existing source." Confinement housing and barns are periodically replaced, allowing the opportunity to install improved systems that provide increased environmental protection. The modern confinement housing used at many swine, dairy, veal, and poultry farms allows for waste handling and storage in a fashion that generates little or no process water. Such systems negate the need for traditional flush systems and storage lagoons, reduce the risks of uncontrollable spills, and decrease the costs of transporting manure.

Third, a source would be a new source if construction is begun after the date this rule is promulgated and its production area and processes are substantially independent of an existing source at the same site. Facilities may construct additional production areas that are located on one contiguous property, without sharing waste management systems or commingling waste streams. Separate production areas may also be constructed to help control biosecurity. New production areas may also be constructed for entirely different animal types, in which case the more stringent NSPS requirements for that subcategory would apply to the separate and newly constructed production area. In determining whether production and processes are substantially independent, the permit authority is directed to consider such factors as the extent to which the new production areas are integrated with the existing production areas, and the extent to which the new operation is engaging in the same general type of activity as the existing source.

EPA also considered whether a certain level of facility expansion, measured as an increase in animal production, should cause an operation to be subject to new source performance standards. If so, upon facility expansion, the CAFO would need to go beyond compliance with BAT requirements to meet the more stringent standards represented by NSPS. In today's proposal, that increment of additional control, for the swine, poultry and veal subcategories, would amount to the need to monitor ground water and install liners in lagoons and impoundments to prevent discharges to ground water that has a direct hydrological connection to surface water; unless the CAFO could demonstrate that no such direct hydrological link existed. In the beef and dairy subcategories, the NSPS proposed today are the same as the BAT standards.

The Agency, however, decided against proposing to identify facility expansion as a trigger for the application of NSPS. Many CAFOs oversize or over-engineer their waste handling systems to accommodate future increases in production. Thus, in many cases, the actual increases in production may not present a new opportunity for the CAFO to install the additional NSPS technologies – e.g. liners. To install liners, these operations would need to retrofit their facilities the same as existing sources would. EPA has explained above that such retrofitting would not be economically achievable

in these animal sectors. Similarly, the costs associated with these requirements would represent a barrier to the expansion. Therefore, it would not be appropriate to require these operations, upon facility expansion, to meet the additional ground water-related requirements that are a part of today's proposed NSPS.

EPA considered the same seven options for new source performance standards (NSPS) as it considered for BAT. EPA also considered an additional option for new dairies, which if selected, would prohibit dairies from discharging any manure or process wastewater from animal confinement and manure storage areas (i.e., eliminating the allowance for discharging overflows associated with a storm event). New sources have the advantage of not having to retrofit the operation to comply with the requirements and thus can design the operation to comply with more stringent requirements. In selecting new source performance standards, EPA evaluates whether the requirements under consideration would impose a barrier to entry to new operations.

EPA is proposing to select Option 3 as the basis for NSPS for the beef and dairy subcategories. Option 3 includes all the requirements proposed for existing sources including complying with zero discharge from the production area except in the event of a 25-year, 24-hour storm and the requirement to develop a PNP which establishes the rate at which manure and wastewater can be applied to crop or pasture land owned or controlled by the CAFO. The application of manure and wastewater would be restricted to a phosphorus based rate where necessary depending on the specific soil conditions at the CAFO. Additionally, other best management practice requirements would apply, including the prohibition of manure and wastewater application within 100 feet of surface water. The proposed new source standard for the beef and dairy subcategories includes a requirement for assessing whether the ground water beneath the production area has a direct hydrological connection to surface water. If a direct hydrological connection exists, the operation must conduct additional monitoring of ground water up gradient and down gradient from the production area, and implement any necessary controls based on the monitoring results to ensure that zero discharge to surface water via the ground water route is achieved for manure stockpiles and liquid impoundments or lagoons. For the purpose of estimating compliance costs, EPA has assumed that operations located in areas with a direct hydrological connection will install synthetic material or compacted clay liners beneath any liquid manure storage and construct impervious pads for any dry manure storage areas. The operator would be required to collect and analyze ground water samples twice per year for total dissolved solids, chlorides, nitrate, ammonia, total coliforms and fecal coliform. EPA is believes that Option 3 is economically achievable for existing sources. Since new sources are able to install impermeable liners at the time the lagoon or impoundment is being constructed, rather than retrofitting impoundments at existing source, costs associated with this requirement should be less for new sources in comparison to existing sources. EPA has concluded that Option 3 requirements will not pose a barrier to entry for new sources.

EPA is proposing to establish NSPS for all swine and poultry operations based on Option 5 and Option 3 combined. In addition the BAT requirements described in Section VIII.C.6, the

proposed new source standards would require no discharge via any ground water that has a direct hydrological link to surface water. As described above, Option 3 requires all CAFOs to monitor the ground water and impose appropriate controls to ensure compliance with the zero discharge standard, unless the CAFO has demonstrated that there is no direct hydrological link between the ground water and any surface waters. The proposed new source standard also restricts land application of manure and wastewater to a phosphorus based rate where necessary depending on the specific soil conditions at the CAFO. Additionally, other best management practice requirements would apply, including that application of manure and wastewater would be prohibited within 100 feet of surface water.

EPA encourages new swine and poultry facilities to be constructed to use dry manure handling. Dry manure handling is currently the standard practice at broiler and turkey operations. As described previously, some existing laying hen operations and most hog operations use liquid manure handling systems. The proposed new source performance standard would not require the use of dry manure handling technologies, but EPA believes this is the most efficient technology to comply with its requirements.

EPA has analyzed costs of installing dry manure handling at new laying hen and swine operations. Both sectors have operations which demonstrate dry manure handling can be used as an effective manure management system. The dry manure handling systems considered for both sectors require that the housing for the animals be constructed in a certain fashion, thus making this practice less practical for existing sources. Both sectors have developed a high rise housing system, which houses the animals on the second floor of the building allowing the manure to drop to the first floor or pit. In the laying hen sector this is currently a common practice and with aggressive ventilation, the manure can be maintained as a dry product. Hog manure has a lower solids content, thus the manure must be mixed with a bedding material (e.g., wood chips, rice or peanut hulls and other types of bedding) which will absorb the liquid. To further aid in drying the hog manure, air is forced up through pipes installed in the concrete floor of the pit. With some management on the part of the CAFO operator, involving mixing and turning the hog manure in the pit periodically, the manure can be composted while it is being stored. The advantages of the high rise system for hogs and laying hens include a more transportable manure, which, in the case of the hog high rise system, has also achieved a fairly thorough decomposition. The air quality inside the high rise house is greatly improved, and the potential for leaching pollutants into the groundwater is greatly reduced. The design standard of these high rise houses include concrete floors and also assume that the manure would be retained in the building until it will be land applied, thus there is no opportunity for storm water to reach the manure storage and virtually no opportunity for pollutants to leach to groundwater beneath the confinement house. EPA believes that the cost savings associated with ease of manure transportation, as well as improved animal health and performance, with the dry manure handling system for hogs will off-set the increased cost of operation and maintenance associated with the high rise hog system. Thus, EPA concludes the high-rise house does not pose a barrier to entry and is the basis for NSPS in both the laying hen and hog sectors. Although the high rise house is the basis of the new source standards for the swine and laying hen sectors, operations are not prevented from constructing a liquid manure handling system. If new

sources in these sectors choose to construct a liquid manure handling system, they would be required to line the lagoons if the operation is located in an area that has a direct hydrologic connection, but the cost associated with lining a lagoon at the time it is being constructed is much less than the cost to retrofit lagoon liners.

EPA proposes to establish new source requirements for the veal subcategory on the basis of Option 5 which requires zero discharge with no overflow from the production area and Option 3 which requires zero discharge of pollutants to groundwater which has a direct hydrological connection to surface water, with the ground water monitoring or hydrological assessment requirements described above. EPA believes that a zero discharge standard without any overflow will promote the use of covered lagoons, anaerobic digesters or other types of manure treatment systems. Additionally, this will minimize the use of open air manure storage systems, thus reducing emission of pollutants from CAFOs.

New veal CAFOs would not be expected to modify existing housing conditions since EPA is not aware of any existing veal operations that use dry manure handling systems. New veal CAFOs would be expected to also use covered lagoons, or anaerobic digesters to comply with the zero discharge standard. New veal CAFOs would be required to line their liquid manure treatment or storage structures with either synthetic material or compacted clay to prevent the discharge of pollutants to ground water which has a direct hydrological connection to surface water. In addition, the CAFO would have to monitor the groundwater beneath the production area to ensure compliance with the zero discharge requirement. The CAFO would not need to install liners or monitor ground water if it demonstrates that there is no direct hydrologic link between the ground water and any surface waters.

In addition to the seven options considered for both existing and new sources, EPA also investigated a new source option for dairies that would prohibit all discharges of manure and process wastewater to surface waters, eliminating the current allowance for the discharge of the overflow of runoff from the production area. To comply with a zero discharge requirement, dairies would need to transform the operation so they could have full control over the amount of manure and wastewater, including any runoff, entering impoundments. Many dairies have drylot areas where calves, heifers, and bulls are confined, as well as similar drylot areas where the0 mature cows are allowed access. EPA estimated compliance costs for a zero discharge requirements assuming that the following changes would occur at new dairies:

(1) Freestall barns for mature cows would be constructed with six months underpit manure storage, rather than typical flush systems with lagoon storage;
(2) Freestall barns with six months underpit manure storage would be constructed to house heifers;
(3) Calf barns with a scrape system would be constructed with a scrape system and six months of adjacent manure storage; and

(4) New dairies would include covered walkways, exercise areas, parlor holding, and handling areas.

Drylot areas are continually exposed to precipitation. The amount of contaminated runoff from such areas that must be captured is directly related to the size of the exposed area and the amount of precipitation. Under the current regulations, dairies use the 25-year, 24-hour rainfall event (in addition to other considerations) when determining the necessary storage capacity for a facility. Imposing a zero discharge requirement that prevents any discharge from impoundments would force dairies to reconfigure in a way that provides complete control over all sources of wastewater. EPA considered the structural changes in dairy design described here to create a facility that eliminates the potential for contaminated runoff.

While EPA believes that confining all mature and immature dairy cattle is technically feasible, the costs of zero discharge relative to the costs for Option 3 are very high. Capital costs to comply with zero discharge increase by two orders of magnitude. EPA estimates annual operating and maintenance costs would rise between one to two orders of magnitude above the costs for Option 3. These costs may create a barrier to entry for new sources. In addition, EPA believes selecting this option could have the unintended consequence of encouraging dairies to shift calves and heifers offsite to standalone heifer raising operations (either on land owned by the dairy or at contract operations) to avoid building calf and heifer barns. If these offsite calf/heifer operations are of a size that they avoid being defined as a CAFO, the manure from the immature animals would not be subject to the effluent guidelines.

EPA is not basing requirements for new dairies on the zero discharge option for the reasons discussed above. EPA solicits comment on the approach used to estimate the costs for new dairies to comply with a zero discharge requirement. Comments are particularly solicited on aspects such as: converting from flush systems to underpit manure storage; types of housing for calves and heifers; and whether the potential for uncontrollable amounts of precipitation runoff have been sufficiently eliminated (including from silage). EPA also solicits comment on a regulatory scenario that would establish a zero discharge requirement for manure and process wastewater from barns (housing either mature or immature dairy cattle) and the milking parlor, but would maintain the current allowance for overflow of runoff from drylot areas.

As an alternative to underpit manure storage, dairies could achieve zero discharge for parlor wastes and barn flush water by constructing systems such as anaerobic digesters and covered lagoons. These covered systems, if properly operated, can facilitate treatment of the manure and offer opportunities to reduce air emissions. The resulting liquid and solid wastes would be more stable than untreated manure. EPA solicits comment on the usefulness of applying stabilization or treatment standards to liquid and slurry manures prior to land application. Commenters encouraging the use of such standards should recommend appropriate measurement parameters such as volatile solids, BOD, COD, and indicator organism reduction(s) to establish stability or treatment levels.

EPA has not identified any basis for rejecting the zero discharge option for dairies solely due to animal health reasons. EPA solicits comment on the technical feasibility of confining mature and/or immature dairy cattle in barns at all times.

Ten-year protection period

The NSPS that are currently codified in Part 412 will continue to have force and effect for a limited universe of CAFOs. For this reason, EPA is proposing to retain the NSPS promulgated in 1974 for Part 412. Specifically, following promulgation of the final rule that revises Part 412, the 1974 NSPS would continue to apply for a limited period of time to certain new sources and new dischargers. See CWA section 306(d) and 40 CFR 122.29(d). Thus, if EPA promulgates revised NSPS for Part 412 in December 2002, and those regulations take effect in January 2003, qualified new sources and new dischargers that commenced discharge after January 1993 but before January 2003 would be subject to the currently codified NSPS for ten years from the date they commenced discharge or until the end of the period of depreciation or amortization of their facility, whichever comes first. See CWA section 306(d) and 40 CFR 122.29(d). After that ten year period expires, any new or revised BAT limitations would apply with respect to toxic and nonconventional pollutants. Limitations on conventional pollutants would be based on the1974 NSPS unless EPA promulgates revisions to BPT/BCT for conventional pollutants that are more stringent than the 1974 NSPS.

Rather than reproduce the 1974 NSPS in the proposed rule, EPA proposes to refer permitting authorities to the NSPS codified in the 2000 edition of the Code of Federal Regulations for use during the applicable ten-year period.

8. Pretreatment Standards for New or Existing Sources (PSES AND PSNS)

EPA is not proposing to establish Pretreatment Standards for either new or existing sources. Further, EPA is withdrawing the existing provisions entitled "Pretreatment standards for existing sources" at §§412.14, 412.16, 412.24, 412.26. Those existing provisions establish no limitations. The vast majority of CAFOs are located in rural areas that do not have access to municipal treatment systems. EPA is not aware of any existing CAFOs that discharge wastewater to POTWs at present and does not expect new sources to be constructed in areas where POTW access will be available. For those reasons, EPA is not establishing national pretreatment standards. However, EPA also wants to make it clear that if a CAFO discharged wastewater to a POTW, local pretreatment limitations could be established by the Control Authority. These local limits are similar to BPJ requirements in an NPDES permit.

9. Effluent Guidelines Controls for Pathogens

The third most common reason for waterbodies being listed on State §303(d) lists as an impaired watershed is pathogens. Degradation of surface waters by excessive levels of pathogens has been attributed to several sources, including natural wildlife, faulty septic systems, and animal agriculture. As described in Section 5, stream water quality may be impacted by animal feeding operations due to feedlot surface runoff, spills from liquid impoundments, tile drain effluent, leaching and runoff from land receiving manure, and seepage from waste storage. Degradation of aquatic and riparian habitat also occurs when animal grazing operations are poorly managed.

In today's notice, EPA is not setting specific requirements for the control of pathogens. The proposed BAT is expected to reduce pathogens to surface waters through the implementation of the zero discharge requirements at the production area, and through the implementation of the PNP at the land application area. Even without explicit requirements or limits for pathogen controls, EPA expects considerable reduction in the discharge of pathogens for reasons described below. Runoff simulations and loadings analysis predict a 50% reduction in fecal coliforms and a 60% reduction in fecal streptococci under the regulatory scenario proposed today. Following this proposal, EPA intends to further analyze technologies for the treatment or reduction of pathogens in manure, and solicits comment on other approaches to control pathogens.

One mechanism for pathogen discharge to surface waters is catastrophic spills, whether caused by intentional discharges or through overflow following major storms. EPA expects the requirements for no discharge from the production area, as well as routine inspection and mandatory management practices for the control of liquid impoundment levels, will reduce catastrophic spills. For the swine and poultry sectors EPA believes the elimination of the storm event at which an overflow is allowed will also reduce discharge of pathogens. At the production area, operators would be required to be handle animal mortalities in a manner so as to prevent contamination of surface water. The proper use of manure as a fertilizer, as specified in the proposed regulations, may result in increased storage capacity and longer retention times of both liquid and solid manure storage, allowing increased opportunity for natural die-off of pathogens. For example, runoff from fields receiving poultry litter that had been stored prior to application showed no significant difference in pathogen content in runoff from control fields (GEIS, 1999), supporting the conclusion that pathogen reductions will occur from increased storage times.

Application rate has been identified as the single most important manure management practice affecting pollution of surface waters from fields receiving manure. Other practices affecting pathogen content in the runoff include amount of application, incorporation methods, tillage, saturation of the receiving field, and elapsed time following application before a rainfall. In one case study, swine lagoon effluent applied to tile drained fields at 1.1 inches showed no difference in runoff quality than the control fields, but application at three times the rate showed high levels of fecal coliform in the surface water. Fecal bacteria in runoff from land receiving fresh manure may often be a significant proportion of the fecal contamination measured in the surface waters. Vegetated filter strips are useful in removing pollutants from runoff on manured fields, particularly nutrients and sediment, but have not been

identified as generally effective in reducing bacterial concentrations in the runoff. Surface applications of manure are more likely to result in fecal coliform transport when the soil is saturated, particularly in fine sandy loam soils.

EPA believes nutrient management practices and rates established in the PNP would limit the quantity of nutrients that may be applied to fields and will reduce the occurrence of manure application to saturated soils, or when a heavy storm event is predicted. Nutrient loss to surface water under these conditions would result in reduced crop yields and would be reflected in revisions made to the PNP in subsequent years translating to a lower manure application rate.

EPA has collected data on technologies useful in treating manure and wastes for pathogens. Anaerobic digesters and even simple manure storage for an extended period of time promote pathogen reductions through selective growth conditions and natural die-off over time. The addition of heat, such as is used in thermophilic digesters, further reduces pathogens. Proper composting processes also involve high temperatures -- achieving temperatures approaching 140 degrees F in the pile. Heat treatment over several days is likely to kill protozoans such as *Giardia* and *Cryptosporidium*. The addition of lime to achieve high alkaline conditions, e.g. achieving a pH š12, also is effective at killing many pathogens by disrupting the cell membrane or disrupting virus viability.

EPA will continue to analyze the performance and applicability of treatments to reduce pathogens in CAFO waste, and will analyze the costs of these processes. The processes described above and others used to significantly reduce pathogens in biosolids or sewage sludge such as heat treatment, drying, thermophilic aerobic digestion, pasteurization, disinfection, and extended storage will be analyzed for their applicability to animal manures. EPA will give consideration to establishing the same performance standards as required for Class A sludge in Part 503. If supported by appropriate data, the final rule could establish these or other appropriate standards as performance standards that the wastes would be required to meet prior to land application. The CAFO would need to demonstrate achievement of these standards prior to land application because of the impracticability of measuring the pollutant loadings in any eventual runoff from the land application areas to the waters. EPA solicits comment on this possible approach and specifically requests data relating to pathogen treatment and reductions that are demonstrated to be effective on CAFO waste. EPA also solicits data on management practices that can be applied to the land application of manure, which may reduce pathogens in runoff.

10. Antibiotics

Related to concerns over pathogens in animal manures are concerns over antibiotics and other pharmaceuticals that may be present in the manure. As discussed in Section V, an estimated 60-80% of all livestock receive antibiotics. Some antibiotics are metabolized, and some are excreted with the manure. In cases where antimicrobials are administered to animals through the feed, spilt feed and wastelage may contribute to antibiotic content of the waste storage. The presence of antibiotics in

manure and the environment has been shown to result in antibiotic resistant pathogens. EPA solicits comments on the direct effects of antibiotic residues and antimicrobial resistance, specifically on how manure management may contribute to the problem of antibiotics reaching the environment and contributing to pathogen resistance. EPA also solicits data and information on effective treatment or practices that may be implemented by CAFOs to reduce these releases.

IX. Implementation of Revised Regulations

A. How Do the Proposed Changes Affect State CAFO Programs?

EPA is proposing a number of changes to the effluent guidelines and the NPDES permit regulations for CAFOs in today's proposed rule. Under 40 C.F.R. § 123.25, authorized NPDES State programs must administer their permit programs in conformance with NPDES requirements, including the requirements that address concentrated animal feeding operations (§ 122.23) and the incorporation of technology-based effluent limitation guidelines and standards in permits (§ 122.44). Thus, today's proposed rule would require the 43 States [note that State is defined in §122.2] with authorized NPDES permit programs for CAFOs to revise their programs as necessary to be consistent with the revised federal requirements. Current NPDES regulations note that authorized NPDES State permit programs are not required to be identical to the federal requirements; however, they must be at least as stringent as the federal program. States are not precluded from imposing requirements that are more stringent than those required under federal regulations.

Any State with an existing approved NPDES permitting program under section 402 must be revised to be consistent with changes to federal requirements within one year of the date of promulgation of final changes to the federal CAFO regulations [40 C.F.R. § 123.62(e)]. In cases where a State must amend or enact a statute to conform with the revised CAFO requirements, such revisions must take place within two years of final changes to the federal CAFO regulations. States that do not have an existing approved NPDES permitting program but who seek NPDES authorization after these CAFO regulatory provisions are promulgated must have authorities that meet or exceed the revised federal CAFO regulations at the time authorization is requested.

In States not authorized to administer the NPDES program, EPA will implement the revised requirements. Such States may still participate in water quality protection through participation in the CWA section 401 certification process (for any permits) as well as through other means (e.g., development of water quality standards, development of TMDLs, and coordination with EPA).

EPA is aware that the majority of States authorized to implement the NPDES program supplement the NPDES CAFO requirements with additional State requirements, and some States currently regulate or manage CAFOs predominantly under State non-NPDES programs. It has been suggested that EPA provide a mechanism through which State non-NPDES CAFO programs can be recognized alternatives that would be authorized under the CWA.