



Technical Development Document for the Final Effluent Limitations Guidelines and Standards for the Meat and Poultry Products Point Source Category (40 CFR 432)

The full document is available at: <http://www.epa.gov/ost/guide/mpp/>

EPA-821-R-04-011



SECTION 13

SELECTED TECHNOLOGY OPTIONS

As discussed in Section 2, EPA must promulgate six types of effluent limitations guidelines (ELGs) and standards for each major industrial category, as appropriate:

- Best Practicable Control Technology Currently Available (BPT)
- Best Control Technology for Conventional Pollutants (BCT)
- Best Available Technology Economically Achievable (BAT)
- New Source Performance Standards (NSPS)
- Pretreatment Standards for Existing Sources (PSES)
- Pretreatment Standards for New Sources (PSNS).

This section describes the rationale for selecting technology options that serve as the basis for the effluent limitations guidelines and standards for the MPP point source category.

13.1 EFFLUENT LIMITATIONS GUIDELINES AND STANDARDS

13.1.1 Best Practicable Control Technology Currently Available (BPT)

In general, the BPT technology level represents the average of the best existing performances of plants of various processes, ages, sizes, or other common characteristics. Where existing performance is considered uniformly inadequate, BPT may be transferred from a different subcategory or industry. Limitations based on transfer of technology must be supported by a conclusion that the technology is indeed transferable and a reasonable prediction that it will be capable of meeting the prescribed effluent limits. (See *Tanners' Council of America v. Train*, 540 F.2nd 1188 (4th Cir. 1976).) BPT focuses on end-of-pipe treatment rather than process changes or internal controls, except where the process changes or internal controls are common industry practice.

The cost-benefit inquiry for BPT is a limited balancing, committed to EPA's discretion, that does not require the Agency to quantify the benefits in monetary terms. In balancing costs in relation to effluent reduction benefits, EPA considers the volume and nature of existing

discharges expected after the application of BPT, the general environmental effects of the pollutants, and the cost and economic impact of the required pollution controls. When setting BPT limitations, EPA is required under Section 304(b) to perform a limited cost-benefit balancing to ensure the costs are not wholly out of proportion to the benefits achieved. (See EPA's revised BPT limitations for subcategories A through D, F through I, J, and K based on Option 2.5.)

13.1.2 Best Control Technology for Conventional Pollutants (BCT)

The BCT methodology, promulgated in 1986 (51 FR 24974), discusses the Agency's consideration of costs in establishing BCT ELGs. EPA evaluates the reasonableness of BCT candidate technologies (those which are technologically feasible) by applying a two-part cost test:

1. The POTW test
2. The industry cost-effectiveness test

In the POTW test, EPA calculates the cost per pound of conventional pollutant removed by industrial dischargers in upgrading from BPT to a BCT candidate technology and then compares this cost to the cost per pound of conventional pollutant removed in upgrading POTWs from secondary treatment. The upgrade cost to industry must be less than the POTW benchmark of \$0.25/lb (in 1976 dollars).

In the industry cost-effectiveness test, the ratio of the incremental BPT to BCT cost divided by the BPT cost for the industry must be less than 1.29 (i.e., the cost increase must be less than 29 percent). The *Economic and Environmental Benefits Analysis of the Final Meat and Poultry Products Rule* (EPA-821-R-04-010) for the final rule provides more details on the calculations of the BCT cost tests.

In developing BCT limits, EPA considered whether there are technologies that achieve greater removals of conventional pollutants than those established for BPT, and whether those technologies are cost-reasonable according to the prescribed BCT tests. For subcategories A

through D, E through I, K, and L, EPA identified no technologies that can achieve greater removals of conventional pollutants than the BPT standards that also pass the BCT cost test. Accordingly, EPA established BCT effluent limitations equal to the current BPT limitations for these subcategories. In the Rendering subcategory (Subcategory J), EPA found that Option 2.5 would achieve greater removal of conventional pollutants and was cost-reasonable under the BCT cost tests and therefore selected this technology as the basis for BCT.

13.1.3 Best Available Technology Economically Achievable (BAT)

In general, BAT ELGs represent the best economically achievable performance of facilities in the industrial subcategory or category. The Clean Water Act (CWA) establishes BAT as a principal national means of controlling the direct discharge of toxic and nonconventional pollutants. The factors considered in assessing BAT include the cost of achieving BAT effluent reductions; the age of equipment and facilities involved; the process(es) employed; potential process changes; non-water quality environmental impacts, including energy requirements; and such other factors as the EPA Administrator deems appropriate. The Agency retains considerable discretion in assigning the weight to be accorded these factors. An additional statutory factor considered in setting BAT is economic achievability. Generally, EPA determines economic achievability on the basis of total costs to the industry and the effect of compliance with BAT limitations on overall industry and subcategory financial conditions.

For purposes of the final rule, EPA has determined that each technology option considered is technically available. EPA has also determined that at least one option is economically achievable for the segment to which it applies. Furthermore, EPA has determined, for the reasons given in Section 12, that none of the technology options has unacceptable, adverse non-water quality environmental impacts. EPA also considered the age, size, processes, and other engineering factors pertinent to facilities in the segments for the purpose of evaluating the technology options. EPA established separate limits for facilities on the basis of size. As discussed in more detail in Section 5, EPA is not establishing more stringent limitations for small meat slaughterers, nor is the Agency revising the limitations for the small meat processors subcategory (Subpart E). EPA survey data indicate that approximately 107 small meat processing

facilities would have been subject to any new limitations. EPA estimated that the additional pollutant reductions achieved by establishing more stringent limitations for those small facilities would be minimal.

13.1.4 New Source Performance Standards (NSPS)

New Source Performance Standards reflect effluent reductions that are achievable based on the best available demonstrated control technology. New facilities have the opportunity to install the best and most efficient production processes and wastewater treatment technologies. As a result, NSPS should represent the most stringent controls attainable through the application of the best available demonstrated control technology for all pollutants (that is, conventional, nonconventional, and priority pollutants). In establishing NSPS, EPA is directed to take into consideration the cost of achieving the effluent reduction and any non-water quality environmental impacts and energy requirements.

In selecting its NSPS technology for these segments and subcategories, EPA considered all the factors specified in CWA section 306, including the costs of achieving effluent reductions and the effect of costs on new projects (barrier to entry). The Agency also considered energy requirements and other non-water quality environmental impacts for the NSPS options and concluded that these impacts were no greater than those for the BAT technology options and are acceptable. EPA therefore concluded that the NSPS technology basis promulgated constitutes the best available demonstrated control technology for those segments.

13.1.5 Pretreatment Standards for Existing Sources (PSES) and New Sources (PSNS)

National pretreatment standards are established for those pollutants in wastewater from indirect dischargers that might pass through, interfere with, or otherwise be incompatible with publicly owned treatment works (POTW) operations. Currently, there are no categorical pretreatment standards for the meat and poultry products (MPP) point source category. EPA is not promulgating ELGs for indirect dischargers; therefore, EPA is not promulgating new pretreatment standards for existing or new MPP indirect dischargers.

13.2 SELECTED TECHNOLOGY OPTIONS FOR EACH SUBCATEGORY

The technology options selected for each of the ELGs and standards (BPT, BCT, BAT, NSPS, and PSNS) are described for each subcategory in sections 13.2.1 through 13.2.6. More detailed information related to the methodologies and results related to estimating the cost-effectiveness and economic achievability of the final rule is provided in the *Economic and Environmental Benefits Analysis of the Final Meat and Poultry Products Rule* (EPA-821-R-04-010).

13.2.1 Subcategories A Through D (Meat Slaughtering Facilities)

13.2.1.1 Small Facilities in Subcategories A through D (meat first processors that slaughter less than or equal to 50 million pounds per year)

EPA did not revise limitations or standards for small facilities in Subcategories A through D. Such facilities continue to be subject to the current limitations in MPP ELGs (40 CFR part 432), as applicable. The current regulations include production-based limitations for these facilities for BOD, TSS, oil & grease, pH, and fecal coliforms for existing sources, and standards for these same pollutants plus the addition of standards for ammonia (as nitrogen) for new sources. The following sections describe EPA's decision to retain the current BPT, BCT, and BAT limitations and NSPS for small direct discharge facilities in Subcategories A through D.

BPT, BCT, and BAT Requirements

EPA proposed not to revise the current BPT, BCT, or BAT limitations for existing small direct dischargers in Subcategories A through D (meat first processors). For the final rule, for these facilities EPA evaluated the cost of achieving pollutant reductions and the economic achievability of compliance with BPT limitations based on the Option 1 technology and the level of the pollutant reductions resulting from compliance with such limitations. Option 1 includes biological treatment, partial nitrification, and disinfection.

EPA estimated that the cost of achieving the effluent reductions for these facilities at Option 1 would be \$198/lb of pollutant removed (1999 dollars).¹ EPA has promulgated ELGs in the past with costs per pound of pollutant removed as high as \$37/lb (1999 dollars) although in general ELGs have had much lower costs per pound. Therefore, EPA evaluated the cost of the treatment technology options to small facilities using \$37/lb removed as guidance for assessing BPT cost-reasonableness.

Consequently, following this approach, EPA determined that the total costs of effluent reductions using the Option 1 technology are not reasonable in relation to the effluent reduction benefits for the following reasons. First, although EPA estimated that implementing the Option 1 technology would result in zero closures, EPA estimated the cost of effluent reductions using the Option 1 technology is \$198/lb removed. Moreover, Option 1 does not remove any additional nutrients and consequently is not “nutrient cost-effective.” For the reasons discussed in this section, EPA concluded that for existing small direct dischargers in Subcategories A through D, Option 1 is not the best practicable control technology, best conventional pollutant control technology, or best available technology economically achievable. Because the other options being considered would require more equipment and therefore higher costs than Option 1, the Agency assumed they would not be considered cost-reasonable. Therefore, EPA determined that it should not promulgate revisions to the current BPT, BCT, or BAT limitations for existing small direct dischargers. These facilities will continue to be subject to the applicable portions of sections 432.10 through 432.40.

NSPS Requirements

When establishing NSPS based on best available demonstrated technology, EPA considers how the cost of complying with any more stringent effluent limitations will affect new facilities trying to enter the industry. The Agency employs a barrier to entry analysis that evaluates the barrier posed to new entrants by the cost of complying with the regulation.

¹In estimating the pounds of pollutants removed by implementing Option 1 technology for these facilities, EPA used the sum of 5-day biochemical oxygen demand (BOD₅) and ammonia (as nitrogen) removed. EPA did not include removals of other pollutants, including chemical oxygen demand (COD), in this analysis because, for example, BOD and COD address many of the same pollutants and including both could result in double counting.

Although, as explained previously, the cost of effluent reductions for existing small facilities in Subcategories A through D might not be cost-reasonable, it is not necessarily the case that the costs for new facilities are as great. Generally, the cost for a new facility to incorporate waste treatment technologies during construction is less than that to retrofit existing facilities.

EPA's barrier to entry analysis compares estimated average incremental capital costs a facility or company incurs to meet the effluent guidelines to average total assets of existing facilities or companies. EPA considered establishing NSPS for small facilities in Subcategories A through D based on Option 1 technology. EPA evaluated the barrier to entry based on a ratio of costs for Option 1 to assets of existing facilities. The Agency estimated a cost-to-assets ratio of 16.7 percent, which the Agency concludes will present a barrier to entry to new facilities. Because the costs for other options would be greater than those for Option 1, these would pose an even greater barrier to entry. For these reasons, EPA did not revise the NSPS limitations for new small direct dischargers in these subcategories. New facilities would continue to be subject to the current NSPS limitations in sections 432.15, 432.25, 432.35, and 432.45.

13.2.1.2 Non-Small Facilities in Subcategories A through D (meat first processors that slaughter more than 50 million pounds per year)

For non-small facilities in Subcategories A through D, EPA revised limitations and standards for some pollutants and established total nitrogen limitations and standards for the first time. EPA did not revise the current limitations (BPT/BCT) or NSPS for conventional pollutants for these facilities. The current regulations include production-based limitations and standards for these facilities for BOD, TSS, oil and grease, pH, and fecal coliforms. EPA revised BPT to include limitations for ammonia (as nitrogen), establishing a BAT limitation for ammonia (as nitrogen) equivalent to the BPT limitation, and establishing BAT/NSPS limitations for total nitrogen. The NSPS for ammonia (as nitrogen) is not being changed. As discussed in Section 15, the revised and new limitations and standards are concentration-based. The following sections discuss the technology bases EPA selected for the final rule for the non-small direct discharge facilities in Subcategories A through D.

BPT Requirements

In 1974 EPA established BPT for the meat subcategories A through D based on biological treatment (e.g., aerobic and anaerobic treatment) to control five conventional pollutants or pollutant parameters (BOD₅, TSS, oil and grease, fecal coliforms, and pH). The BPT limitations did not include limits for ammonia (as nitrogen) because nitrification was not a widely used technology and therefore not the BPT at the time. EPA notes, however, that the BPT that was the basis for the 1974 limitations provided some incidental ammonia removal through nitrification during extended aeration, which resulted in some reduction in ammonia (as nitrogen). EPA did attempt to establish ammonia limitations under BAT based on a technology other than nitrification (which was more advanced than the 1974 BPT). Those limitations were the subject of judicial challenge and were remanded to EPA for further consideration (*American Meat Institute v. Environmental Protection Agency*, 526 F.2d 442 (7th Cir. 1975)). In 2002 EPA proposed new BPT limitations for ammonia (as nitrogen) based on Option 2 for non-small facilities in Subcategories A through D (facilities with production rates greater than 50 million pounds live weight killed (LWK) per year). As described in Section 9, Option 2 consists of biological treatment followed by more complete nitrification than Option 1 to further reduce ammonia levels and disinfection.

EPA established BPT limitations for ammonia (as nitrogen) for non-small direct dischargers in Subcategories A through D based on the proposed technology option (Option 2). EPA concluded that “more complete” nitrification is now a widely available pollution control technology that should be the basis for the BPT ammonia limitation. For these guidelines, EPA is not revising BPT limitations for the conventional pollutants.

EPA concluded that the Option 2 treatment technology represents the BPT for control of ammonia (as nitrogen) while providing incidental removals of additional conventional pollutants, particularly BOD₅ and TSS, and is the basis for the BPT limitations for these facilities for the following reasons.

First, this technology is available and readily applicable to all non-small facilities in Subcategories A through D. Approximately 97 percent of the non-small direct discharging

facilities in these subcategories currently use the Option 2 technology or better. Although most facilities have the components of Option 2 technology in place (e.g., nitrification basin/aerobic reactor), some facilities are not achieving the Option 2 long-term average (LTA) concentration for ammonia or the additional removals of the conventional pollutants. EPA attributes this to their failure to operate or maintain the Option 2 technology adequately. Consequently, when estimating the costs of compliance with Option 2 for purposes of evaluating its reasonableness and for estimating economic impacts, EPA included costs for treatment optimization that a number of facilities would need to achieve the Option 2 LTAs. For example, EPA included costs for increased aeration, detention time (capacity), chemical addition, sludge handling, process controls, and additional in-process sampling and analytical testing. (See Sections 10 and 11 for additional discussion of the cost and loading methodologies.)

Second, the cost of compliance with these limitations relative to the effluent reduction benefits is not disproportionate. Based on EPA's economic analysis, EPA concluded that compliance with BPT limitations based on Option 2 technology should not result in closures of any existing non-small direct dischargers in these subcategories. Moreover, adopting this level of control will reduce the quantity of ammonia (as nitrogen) and other pollutants currently being discharged into the environment.

For meat first processor facilities that produce more than 50 million pounds LWK per year, EPA estimated an annual compliance cost for Option 2 of \$7.29 million (pre-tax, 1999 dollars). It also estimated 3.8 million pounds of BOD₅ and ammonia (as nitrogen) removed from current discharges into the Nation's waters (for \$2.55/lb pollutant removed (1999 dollars)). In estimating the pounds of pollutant removed by implementing Option 2 technology for these facilities, EPA used the sum of BOD₅ and ammonia (as nitrogen) removed. EPA tried to avoid "double-counting" pollutant reductions that would occur if, for example, the Agency summed removals of COD and BOD. As previously explained, EPA evaluated BPT costs and removals using, as guidance, \$37/lb removed in 1999 dollars as a point of comparison. EPA, therefore, determined that the total cost of effluent reductions due to the Option 2 technology (\$2.55/lb pound removed) is reasonable in view of the effluent reduction benefits.

EPA found that 32 percent of the non-small facilities in these subcategories use Option 2.5 (which includes partial denitrification). Although the Option 2.5 technology is demonstrated, it is not as widely available as the Option 2 technology. Moreover, the pollutant loading reduction for ammonia (as nitrogen) for Option 2.5 is the same as the reduction estimated for Option 2 but costs \$9 million more every year. Therefore, EPA did not select Option 2 as the basis of BPT limitations.

EPA did not select Option 2.5+P or Option 4 as the basis for BPT limitations because as they do not achieve additional pollutant reductions at a cost EPA considers reasonable. For example, Option 2.5+P does not achieve additional removals of ammonia (as nitrogen) but would cost an additional \$36 million annually. Option 4 would remove an additional 59,000 pounds of ammonia (as nitrogen) at an additional cost of \$45 million annually. Moreover, EPA notes that Option 2.5+P represents control technology not closely related to the technology basis for the earlier BPT regulations. Chemical phosphorus removal is not closely connected to the nitrification and disinfection technology that was the basis of the 1974 BPT limitations for Subcategories A through D. The Agency did not select other options considered for BPT because they were not readily available and/or produced an unfavorable total BPT cost and removal comparison. Detailed discussions explaining why EPA rejected setting BPT limitations based on these other technology options are contained in the proposal and the Notice of Data Availability (NODA; see 67 FR 8637, February 25, 2002, and 68 FR 48499, August 13, 2003).

Although EPA did not change the technology basis from that proposed, the Agency promulgated BPT limitations for non-small facilities in Subcategories A through D that are slightly different from those proposed. First, where EPA promulgated BPT limitations for pollutants like ammonia (as nitrogen) for which EPA had not previously set BPT limits for these subcategories, the final limitations are based on revised and additional data reflecting the types of changes described in the NODA (see 68 FR 48495). In addition, where EPA is adopting new or revised BPT limitations, it has expressed them in a concentration-based form, whereas the unchanged limitations will continue to be expressed as production-based limits. (See Section 15 for guidance on how both types of limits can be implemented together in permits.)

BCT Requirements

For both the proposed and final rules, in deciding whether to adopt more stringent limitations for BCT than for BPT, EPA considered technologies that might achieve greater removals of conventional pollutants than those adopted for BPT. It also looked at whether those technologies are cost-reasonable under the standards established by the CWA. EPA refers to the decision criteria as the “BCT cost test.”

EPA did not revise the current BPT effluent limitations for conventional parameters (pH, BOD₅, TSS, oil and grease, and fecal coliforms) for non-small meat first processors (Subcategories A through D). Therefore, when considering a technology that would achieve greater removals of conventional pollutants than that adopted for BPT, EPA compared the removals achievable through implementation of the Option 2 technology (which EPA considered as the possible technology basis for BCT) to current BPT limitations. EPA estimated that Option 2 removed about an additional 610,000 pounds per year of BOD₅ and 970,000 pounds per year of TSS compared to pollutant reductions by facilities meeting or exceeding current BPT limitations. There are no additional removals of oil and grease or fecal coliforms.

EPA evaluated Option 2 under the BCT cost test and it failed (see the *Economic and Environmental Benefits Analysis of the Final Meat and Poultry Products Rule* (EPA-821-R-04-010)). EPA did not evaluate technology options, such as Option 2+F (Option 2 plus the addition of a filter) because they are more costly and would not remove significantly more conventional pollutants than Option 2. Therefore, if Option 2 did not pass the BCT cost test, those options would not pass. The Agency did not identify any technologies that pass the BCT cost test and achieve greater removals of conventional pollutants than the current BPT technology. Thus, EPA did not revise the BCT limitations for these facilities. Non-small facilities in Subcategories A through D will continue to be regulated by the current BCT limitations (which are equivalent to the current BPT limitations) in sections 432.17, 432.27, 432.37, and 432.47.

BAT Requirements

EPA proposed to establish the BAT level of regulatory control for non-small facilities in Subcategories A through D based on Option 3 (biological treatment, more complete nitrification, more complete denitrification and disinfection). As discussed in the NODA, after review and evaluation of the revised and new data, EPA reconsidered its assessment of Option 3 as BAT. EPA determined that Option 3 did not meet all the statutory criteria for BAT. Therefore, the Agency refocused its evaluation for the technology basis for BAT on Option 2.5, Option 2.5+P, and Option 4 for nutrient removal. For the final rule, EPA based the BAT limitations for non-small facilities in Subcategories A through D on Option 2.5 technology and is promulgating a limitation for total nitrogen on this basis. EPA did, however, set a limitation for ammonia (as nitrogen) that is equal to BPT.

This section describes EPA's rationale for selecting Option 2.5 technology and rejecting Option 2.5+P and Option 4 for the basis of the total nitrogen limitation and for selecting to set BAT equal to BPT (based on Option 2) for ammonia (as nitrogen). Both the proposal and the NODA contain detailed discussions explaining why EPA rejected setting BAT limitations based on other more stringent technology options (see 67 FR 8629, February 25, 2002, and 68 FR 48499, August 13, 2003).

EPA selected Option 2.5 technology as the basis of BAT for non-small facilities in Subcategories A through D for the following reasons. First, Option 2.5 technology has been demonstrated as available because 32 percent of the non-small facilities in Subcategories A through D use the components of Option 2.5 technology (e.g., facility has in place a denitrification basin, nitrification basin and disinfection) or more advanced technology. EPA, however, determined that facilities in Subcategories A through D with the components of Option 2.5 technology in place are not operating their systems optimally based on review of the BOD:TKN ratios (68 FR 48500, August 13, 2003). EPA concluded that for effective denitrification to occur, facilities must be achieving a minimum BOD:TKN ratio of 3. In addition, these facilities were not achieving at least a 60 mg/L total nitrogen concentration in the effluent. (EPA used 60 mg/L as a minimum standard for facilities it considered in developing the

BAT LTA limitation for total nitrogen.) EPA did have data from poultry first processing facilities with Option 2.5 technology that met all BAT selection criteria, indicating that the poultry facilities' treatment systems were well operated. For this reason, when estimating costs and pollutant reductions and developing limitations associated with Option 2.5, EPA used the LTA concentration for total nitrogen from well-operated Option 2.5 poultry first processing facilities (see Section 14). EPA included costs (such as costs for lagoon bypass, additional carbon source, or two-stage denitrification) for the meat first processing facilities to achieve the poultry Option 2.5 LTA for total nitrogen.

Second, Option 2.5 is economically achievable. EPA estimated the pretax annualized compliance costs (in 1999 dollars) for Option 2.5 to be \$16.7 million. Using the facility and company closure methodologies described in the *Economic and Environmental Benefits Analysis of the Final Meat and Poultry Products Rule* (EPA-821-R-04-010), EPA estimated that no facilities or companies will close. EPA performed an alternative analysis by estimating closures using more conservative assumptions; that is, EPA predicted a closure would occur if the facility failed under one of three forecast methodologies, rather than under at least two out of three. Using the alternative analysis, EPA estimated two facility closures under Option 2.5. Because not all facilities are covered by the closure analysis, it might understate the number of facility closures nationally.

As discussed in the NODA (68 FR 48489, August 13, 2003), EPA tried to determine whether additional companies own direct discharging MPP facilities. The Agency identified, based on the screener survey results, three additional companies across all subcategories that might own direct discharging MPP facilities. Therefore, the company-level analysis might underestimate the number of company closures nationally but to a lesser degree than the facility-level analysis.

EPA also considered the cost-effectiveness of nutrient removal as one aspect of its evaluation of BAT options for this industry as a whole. As discussed in the proposed rule and the NODA, EPA established a benchmark for nitrogen removal of \$4/lb, based on studies of nitrogen removal by publically owned treatment works (POTWs) with biological nutrient removal, and a

benchmark for phosphorus removal of \$10/lb, based on studies of agricultural best management practices that reduce phosphorus discharges. EPA used these benchmarks for nutrients in connection with the effluent guidelines for concentrated animal feeding operations (CAFOs). Under the CAFO effluent guidelines, EPA promulgated regulations for industry sectors (e.g., the dairy sector) where the nutrient cost-effectiveness exceeded these values for the individual sectors but maintained a nutrient cost-effectiveness that was under these values for the rule as a whole. Therefore, EPA evaluated each segment or subcategory in the MPP category in comparison to the \$4/lb for nitrogen and \$10/lb for phosphorus values, but ultimately evaluated whether poor nutrient cost-effectiveness of an individual segment/subcategory would change the nutrient cost-effectiveness for the rule as a whole.

For Option 2.5 for subcategories A through D, EPA estimated 15.4 million pounds removed per year of total nitrogen and nutrient cost-effectiveness of \$1.08/lb of total nitrogen removed. Because Option 2.5 does not include phosphorus removal, EPA did not calculate nutrient cost-effectiveness for phosphorus for Option 2.5. EPA concluded that Option 2.5 is nutrient cost-effective for total nitrogen.

EPA considered Option 2.5+P as the basis of BAT but rejected it for the following reasons. First, no facilities in EPA's database for Subcategories A through D use Option 2.5+P technology. Second, EPA estimated the pretax annualized cost of Option 2.5+P to be \$42.9 million. EPA believed these costs might be underestimated. Based on information provided in comments on the NODA and further analysis, EPA concluded that the average annual cost of increased alum addition and the resulting increased sludge generation and disposal might range from \$108,000 to \$378,000 more per facility than previously estimated for this subcategory. Option 2.5+P removes an estimated 4.5 million pounds per year of total phosphorus and achieves the same level of nitrogen and conventional pollutant reduction as Option 2.5. Although the cost per pound of phosphorus removed using the estimated cost of \$42.9 million is \$9.49/lb, EPA believes that the actual cost per pound would be greater than \$10 because of the additional costs noted above. Although EPA selected options where the nutrient cost-effectiveness is greater than the reference values (\$4/lb nitrogen removed and \$10/lb phosphorus removed) for an individual subcategory or segment, EPA has not done so in cases where selecting such an option would

raise the nutrient cost-effectiveness of the rule, as a whole, over these values. With a phosphorus cost-effectiveness over \$10/lb for non-small facilities in Subcategory A through D, the phosphorus cost-effectiveness for the rule, as a whole, would be greater than \$10/lb total phosphorus removed. Therefore, considering the lack of availability of the technology and the unfavorable nutrient cost-effectiveness for phosphorus, EPA rejected Option 2.5+P as the basis of BAT limitations.

EPA considered Option 4 (which includes more complete denitrification and chemical phosphorus removal) as the basis of BAT but did not select it because of the high increase in cost compared to Option 2.5 and the poor incremental nutrient cost-effectiveness (the high cost to remove additional nutrients compared to Option 2.5+P).

EPA estimated that there are no direct discharging facilities in these subcategories currently operating Option 4 technology. EPA estimated the pretax annualized compliance costs for Option 4 to be \$52.0 million (1999 dollars), which is \$9.1 million more than Option 2.5+P and \$35.3 million more than Option 2.5. EPA estimated that Option 4 removes 18.5 million pounds per year of nitrogen (3.1 million more pounds per year than Option 2.5 or Option 2.5+P) and 5.0 million pounds per year of phosphorus (approximately 500,000 more pounds per year than Option 2.5+P). EPA estimated no facility or company closures for Option 4. Finally, EPA estimated the incremental nitrogen cost-effectiveness (as compared to Option 2.5) to be \$11.56/lb of total nitrogen removed and the incremental phosphorus cost-effectiveness (as compared to Option 2.5+P) to be \$20.09/lb of total phosphorus removed. The incremental nutrient cost-effectiveness of Option 4 is above the benchmark values; therefore, EPA did not consider Option 4 cost-effective.

EPA established BAT limitations for ammonia (as nitrogen) that are equivalent to the limitations promulgated in the final rule under BPT. EPA considered setting more stringent limitations for ammonia (as nitrogen) under BAT; however, the selected BAT technology option (Option 2.5) does not remove any additional quantity of ammonia (as nitrogen). Although Option 4 does remove some additional pounds of ammonia (as nitrogen) as compared to Option 2, EPA did not select Option 4 for BAT for the reasons discussed earlier in this section.

NSPS Requirements

As previously discussed, when establishing NSPS, EPA considers whether increased compliance costs related to the effluent guidelines regulation might create a barrier for a new facility to enter the industry and whether there are any new source standards currently in place for the subcategory. The barrier to entry analysis compares the estimated average increase in facility or company capital costs to meet the effluent guidelines to the average total assets of existing facilities or companies. EPA did not have data on the assets of new entrants because, in general, they cannot be identified before they are established. Therefore, EPA used data on the assets of existing facilities. The extent to which potential new entrants have total assets similar to those of existing industry participants provides a proxy for potential barriers to entry that new facility compliance costs may represent.

EPA performed an analysis to evaluate the effect of the rule on the costs to new entrants into the meat and poultry products industry by calculating the ratio of average capital costs to average total assets as a measure of the potential for barriers to entry that the MPP rule could create for these facilities. If the barrier to entry ratio is large, there is a possibility that the rule will discourage entry into the MPP market.

EPA estimated the ratio of costs to assets for Options 2.5, 2.5+P, and 4. The ratios are 1.6 percent for Option 2.5, 2.6 percent for Option 2.5+P, and 3.3 percent for Option 4. The estimates for Options 2.5+P and 4, however, do not reflect EPA's additional evaluation of the costs for chemical phosphorus based on comments received (see DCN 300,025). From this additional evaluation, EPA concluded that the average annualized costs for chemical phosphorus removal might be \$108,000 to \$378,000 per facility more than the costs used in EPA's barrier to entry analysis. With these additional costs, the ratio might rise to a level that the Agency would consider a barrier to entry for Options 2.5+P and 4.

EPA decided to revise the standards for new sources for ammonia (as nitrogen) to be equivalent to the BPT limitations being established in the final rule based on Option 2 and to establish standards for total nitrogen equivalent to the BAT limitations being established based on Option 2.5. These standards do not present a barrier to entry. Although there are existing

NSPS for these facilities, they do not include standards for total nitrogen. In addition, the revised NSPS for ammonia (as nitrogen) is based on the best demonstrated technology (i.e., more complete nitrification) whereas the current NSPS for ammonia (as nitrogen) is based on the current BAT limitations set in 1974 and achieves a lower level of nitrification (or may include ammonia stripping) (See p. 150, *Development Document for Effluent Limitations Guidelines and New Source Standards for the Red Meat Processing Segment of the Meat Product and Rendering Processing Point Source Category*, February 1974). Moreover, at the time the current NSPS were promulgated, nitrification technology was not well established and, in many cases, was available in only pilot plant or laboratory settings. Page 155 of the technical development document for the 1974 rule states: “Each of the identified BAT technologies, except ammonia removal, is currently being practiced in one or more packing plants.”

13.2.2 Subcategory E (Small Processors)

Subcategory E includes the smallest meat further processing facilities (meat further processing facilities that produce 6,000 pounds or less per day). In 2002 EPA proposed not to revise the regulations for existing or new direct dischargers in Subcategory E. EPA did not propose to revise the existing limitations applicable to smaller MPP facilities (including all facilities in Subcategory E) because EPA determined that “small” MPP facilities discharge a very small proportion of the total industry discharge and that improved treatment would produce only a limited amount of loadings removal (67 FR 8623, February 25, 2002). EPA did not receive comment or additional information to persuade it to revise the existing ELGs and standards for this subcategory. Therefore, the current part 432 regulations continue to apply to those facilities (section 432.50).

13.2.3 Subcategories F through I (Meat Further Processing Facilities)

To allow for different limitations for small and non-small meat further processing facilities, EPA’s 2002 proposal called for a production threshold of 50 million pounds (finished product) for facilities in Subcategories F through I. EPA is retaining that production threshold for the final rule. Therefore, EPA addresses small facilities and non-small facilities separately. Note the meat processors that process 6,000 pounds or less per day (1.56 million pounds per year) are

not included in Subcategories F through I, but are covered under Subcategory E. Costs in this section are presented in 1999 dollars because 1999 is the base year of the survey.

13.2.3.1 Small Facilities in Subcategories F through I (meat further processors that process more than 6,000 pounds per day but less than or equal to 50 million pounds per year)

EPA did not revise limitations or standards for small facilities in Subcategories F through I. Meat further processing facilities that produce greater than 6,000 pounds per day but less than or equal to 50 million pounds per year of finished product will continue to be subject to the current limitations in the meat and poultry products effluent limitations guidelines (part 432), as applicable. The following sections discuss EPA's decision to retain the current BPT, BCT, and BAT limitations and NSPS for small direct discharge facilities in Subcategories F through I.

BPT, BCT, and BAT Requirements

EPA proposed not to revise the BPT, BCT or BAT limitations for existing small meat further processors in Subcategories F through I. In part 432, small facilities in Subcategories F through I currently have BPT limitations for the five conventional pollutants and BAT limitations for ammonia. EPA did not propose to revise BPT limitations for conventional pollutants for small facilities in these subcategories. EPA evaluated the cost of additional technology (e.g., filtration) under the BCT cost test and it failed. Therefore, EPA did not revise the conventional pollutant limitations under BCT for small facilities in Subcategories F through I.

For the final rule, EPA considered revising the ammonia (as nitrogen) limitations under BAT. EPA evaluated the cost of achieving pollutant reductions and the economic achievability of compliance with limitations based on Option 1 and Option 2 technology. Option 1 includes biological treatment, partial nitrification, and disinfection, and Option 2 accomplishes more complete nitrification (i.e., ammonia removal) than Option 1 technology. When evaluating BAT technology, EPA must determine whether the technology is available and economically achievable. EPA must also determine whether the identified technology is best. EPA typically evaluates a technology's cost-effectiveness as a factor in its decision. When considering cost-effectiveness (except for nutrients), EPA typically evaluates additional pollutant reductions in

toxic pound-equivalents. EPA estimated that the annualized cost of Option 1 and Option 2 are about \$1.10 and \$1.11 million (pre-tax, 1999 dollars), respectively, which represents approximately 9.4 percent of net income. Using the closure methodology described in the *Economic and Environmental Benefits Analysis of the Final Meat and Poultry Products Rule* (EPA-821-R-04-010), there is a very small probability that there could be one facility closure out of sixteen facilities under either option: the probability of closure is 1.49 percent and 1.51 percent, respectively. EPA estimated that Option 1 achieves a reduction of 5 toxic pound-equivalents per year, and Option 2 achieves a reduction of 15.2 toxic pound-equivalents per year, resulting in a toxic cost-effectiveness of \$129,000 per toxic pound-equivalent (in 1981 dollars) for Option 1 and \$42,900 per toxic pound equivalent (1981 dollars) for Option 2. Historically, EPA evaluated BAT technology using a toxic cost-effectiveness value of \$200/toxic pound-equivalents (1981 dollars). Therefore, EPA determined that Options 1 and 2 are not cost-effective and are not economically achievable best available technology.

For existing small direct dischargers in the Subcategories F through I, the Agency found neither Option 1 nor Option 2 is the best practicable control technology, best conventional pollutant control technology, or best available technology economically achievable. Therefore, EPA did not revise BPT, BCT, or BAT limitations for existing small meat further processors. These facilities will remain subject to sections 432.60 through 432.90, as applicable.

NSPS Requirements

In 2002, EPA proposed not to revise the current new source performance standards for small facilities in Subcategories F through I (meat further processors). For the final rule, EPA concluded that the data on these facilities is insufficient to determine if Option 1 or Option 2 technology would present a barrier to entry. In addition, the analysis of barrier to entry data for these subcategories was complicated by the fact that some facilities performing operations fitting within the scope of Subcategories F through I also perform operations that are regulated under Subcategory L (poultry further processors). EPA notes that its analysis of Options 1 and 2 as candidate BAT technologies for ammonia removal in these subcategories showed insignificant additional removals above its cost-effectiveness benchmark. While new facilities may be able to

install technology at lower cost than existing facilities, it is unlikely that the costs would be low enough for the cost-effectiveness to approach a reasonable value. Finally, EPA also considered whether or not there were any new source performance standards currently in place when deciding whether to revise new source performance standards. There are current new source performance standards for these facilities which appear to be adequate. Therefore, EPA did not revise NSPS for new small meat further processors. New sources are subject to the current NSPS limitations in sections 432.65, 432.75, 432.85, and 432.95.

13.2.3.2 Non-Small Facilities in Subcategories F through I (meat further processors that process more than 50 million pounds per year)

For non-small facilities in Subcategories F through I, EPA established limitations and standards for total nitrogen for existing and new sources and establishing ammonia (as nitrogen) standards for new sources. EPA did not revise the current limitations (BPT/BCT) or new source performance standards (NSPS) for conventional pollutants and did not revise the current BAT limitations for ammonia (as nitrogen). The current regulations include production-based limitations and standards for these facilities for BOD, TSS, oil and grease, pH, and fecal coliforms for existing and new sources and a concentration-based limitation for ammonia (as nitrogen) for existing sources. As discussed in Section 14, the new limitations and standards are concentration-based. The following sections discuss the technology bases EPA selected for the final rule for the non-small direct discharge facilities in Subcategories F through I.

BPT Requirements

EPA established BPT for the meat further processors (Subcategories F through I) in 1975, based on biological treatment (e.g., aerobic and anaerobic treatment) to control five conventional pollutants or pollutant parameters (BOD₅, TSS, oil & grease, fecal coliforms, and pH). The current limitations for ammonia (as nitrogen) for non-small meat further processors are contained in BAT and not BPT. Therefore, this section does not discuss BPT limitations for ammonia (as nitrogen). In February 2002, EPA proposed new BPT limitations for chemical oxygen demand (COD) based on Option 2 in an effort to better reflect current BPT treatment technology for non-

small meat further processing facilities (67 FR 8630, February 25, 2002). See Section 7.3.2 for a discussion on why EPA is not establishing BPT limitations for COD in the final rule.

EPA did not revise the conventional pollutant limitations for non-small meat further processing facilities (Subcategories F through I) in the final rule and such facilities will remain subject to the BPT limitations in sections 432.62, 432.72, 432.82, and 432.92.

BCT Requirements

When deciding whether to adopt more stringent limitations for BCT than BPT, EPA considers technologies that might achieve greater removals of conventional pollutants than those adopted for BPT.

EPA did not promulgate new BPT effluent limitations for conventional parameters (i.e., pH, BOD₅, TSS, oil and grease, and fecal coliforms) for non-small meat further processors (Subcategories F through I). When considering a technology that would achieve greater removals of conventional pollutants than adopted for BPT, EPA compared the removals achievable through implementation of the Option 2 technology (which EPA considered as the possible technology basis for BCT) to current BPT limitations. EPA estimated that Option 2 removes approximately 21,700 pounds more per year of BOD₅ compared to conventional pollutant reductions by facilities meeting or exceeding current BPT limitations. There are no additional removals of TSS, oil and grease, or fecal coliforms.

EPA evaluated Option 2 under the BCT cost test and it failed (see the *Economic and Environmental Benefits Analysis of the Final Meat and Poultry Products Rule* EPA-821-R-04-010). EPA did not evaluate other technology options, such as Option 2 + F (Option 2 plus the addition of a filter), because they are more costly and do not remove significantly more conventional pollutants than Option 2. If Option 2 did not pass the cost test, these more expensive options would not pass. The Agency did not identify any technologies that pass the BCT cost test and achieve greater removals of conventional pollutants than the current BPT technology. Thus, EPA did not revise the BCT limitations for these facilities. Non-small meat further processing facilities in Subcategories F through I will remain subject to the current

BCT limitations (which are equivalent to the current BPT limitations for conventional pollutants) in sections 432.67, 432.77, 432.87, and 432.97.

BAT Requirements

EPA proposed to establish the BAT level of regulatory control for non-small meat further processors (Subcategories F through I) based on Option 3 (i.e., biological treatment, more complete denitrification, more complete nitrification, and disinfection). As discussed in the NODA, after review and evaluation of the revised and new data, EPA reconsidered its assessment of Option 3 as BAT technology. EPA determined that Option 3 did not meet all the statutory criteria for BAT. The Agency refocused its evaluation for the technology basis for BAT on Option 2.5, Option 2.5+P, or Option 4 for nutrient removal (see Section 9 for a description of the technology options). For the final rule, EPA based the BAT limitations for total nitrogen for these facilities on Option 2.5 technology and promulgated a limitation for total nitrogen on this basis. EPA did not revise the current BAT limitation for ammonia (as nitrogen).

EPA evaluated whether revising the current BAT limitation for ammonia (as nitrogen) based on Options 2, 2.5, 2.5+P, or 4 treatment technologies could be supported. When evaluating revision of BAT for non-conventional pollutants that are not nutrients, EPA considers not only whether the technology option is available and economically achievable, but also whether it is best. EPA typically evaluates a technology's cost-effectiveness as a factor in its decision. When considering cost-effectiveness (except for nutrients), EPA typically looks at the costs of the additional pollutant reductions (in toxic pound-equivalents).

EPA estimated the annualized cost of each technology option under review. The approximate annualized cost of the technology options ranged from \$266,000 for Option 2 to \$798,000 for Option 4 (pretax, 1999 dollars). Using the closure methodology, EPA projected that there would be a slight probability (0.5 percent) that at most one facility would close under any of the technology options. However, the average toxic cost-effectiveness numbers range from \$8,000 per toxic pound-equivalent (1981 dollars) for Option 2 to \$18,400 per toxic pound-equivalent (1981 dollars) for Option 4. These high values are due to the very minimal incremental reduction in toxic pound-equivalents: 19.4 toxic pound-equivalents/year for Options

2, 2.5, or 2.5+P and 25.3 toxic pound-equivalents/year for Option 4. EPA typically uses \$200 per toxic pound-equivalents (in 1981 dollars) as an indication of cost-effectiveness for toxic pollutants. Therefore, EPA determined that Options 2, 2.5, 2.5+P, and 4 are a not cost-effective basis for revising current ammonia (as nitrogen) limitations for non-small facilities in these subcategories when compared with those currently being achieved.

The following section describes EPA's rationale for selecting Option 2.5 technology and rejecting Options 2.5+P and 4 as the basis of BAT limitations for nutrients. EPA did not consider Option 2 for control of nutrients as it is not designed to reduce total nitrogen or total phosphorus. Both the proposal and the NODA contain detailed discussions explaining why EPA rejected setting BAT limitations based on other technology options (see 67 FR 8629, February 2002 and 68 FR 48499, August 13, 2003).

EPA selected Option 2.5 technology as the basis of BAT control for total nitrogen for non-small meat further processing facilities (Subcategories F through I) because it is demonstrated as available and is economically achievable. First, although no facilities in these subcategories use Option 2.5 technology, this technology has been demonstrated as available in all other subcategories of the MPP industry. EPA notes that it did not have any detailed survey respondents that are within the scope of Subcategories F through I and that based on its screener questionnaire database, EPA estimated only four non-small facilities in these subcategories. Based upon information collected from facilities in this subcategory who received screener surveys, all of the facilities are estimated to be currently achieving the LTA of Option 2.5 for total nitrogen.

Second, Option 2.5 is economically achievable. EPA estimated the pretax annualized compliance costs (in 1999 dollars) for Option 2.5 to be \$329,000. These costs are conservative and may be overstated as they include costs for the components of Option 2.5 technology even at facilities where the effluent concentrations are below the LTA for Option 2.5. EPA chose to possibly overestimate costs in this subcategory because of the uncertainty regarding the numbers of facilities in these subcategories and lack of detailed information on their operations. This is due to the small number of screener survey respondents and the fact that EPA does not have any

detailed survey respondents from these subcategories. In addition, EPA's finding of economic achievability in the final rule is based on the estimated costs of implementing the components of the model technology, not on achieving the resulting limitations. Using the facility and company closure methodologies, EPA estimated a 0.2 percent probability of facility-level closure (i.e., at most one facility closure).

EPA also considered the cost-effectiveness of nutrient removal when evaluating BAT options for this industry segment. However, as previously noted, all non-small meat further processing facilities (Subcategories F through I) in EPA's database are already achieving the Option 2.5 LTAs. Therefore, EPA estimated zero additional pounds removed per year of total nitrogen and could not calculate a nutrient cost-effectiveness for nitrogen.

Furthermore, there is the possibility that facilities in subcategories A through D that perform further processing may be at a competitive disadvantage if facilities in subcategories F through I do not have equivalent limits. In addition, EPA does not want to encourage companies to split their operations in order to be subject to lower limits.

EPA considered Option 2.5+P as the basis of BAT, but rejected it for the following reasons. First, no non-small meat further processing facilities in EPA's database use Option 2.5+P technology. Second, Option 2.5+P costs an additional \$30,000 annually for no additional pollutant reductions when compared to Option 2.5. Therefore, this technology was not considered to be cost-effective.

EPA considered Option 4 as the basis of BAT but did not select it due to the lack of availability of the technology option, the high increase in cost compared to Option 2.5, and the poor incremental nutrient cost-effectiveness (i.e., the high cost to remove additional nutrients compared to Option 2.5+P).

EPA estimated that there are no facilities in these subcategories currently operating Option 4 technology. In addition, EPA estimated the pre-tax annualized compliance costs for Option 4 to be \$798,000 (1999 dollars), which is \$469,000 more than Option 2.5. EPA estimated that Option 4 removes approximately 80,000 pounds per year of nitrogen and zero pounds per

year of phosphorus. Using the facility and company closure methodologies, EPA estimated a 0.5 percent probability of facility-level closure (i.e., at most one facility closure). Finally, EPA estimated the average nutrient cost-effectiveness for nitrogen to be \$10.02/lb of total nitrogen removed, while the incremental nitrogen cost-effectiveness relative to Option 2.5 is \$5.89/lb. Both of the figures are above the \$4/lb benchmark for nitrogen removal. Therefore, EPA did not consider Option 4 to be cost-effective.

NSPS Requirements

In 2002 EPA proposed to revise the current new source performance standards for non-small facilities in Subcategories F through I (meat further processors) based on Option 3 technology. EPA estimated only four non-small direct discharge meat further processing facilities, and therefore, has insufficient data on these facilities to determine if Options 2.5, 2.5+P, or 4 would present a barrier to entry. When deciding whether to promulgate revised new source performance standards, EPA considered whether or not there are any new source performance standards currently in place. EPA revised existing source BAT limitations for non-small meat further processors based on Option 2.5 technology for total nitrogen and did not revise BAT limitations for ammonia (as nitrogen). Although there currently are new source performance standards for these facilities, they do not include limitations for total nitrogen or ammonia (as nitrogen). Therefore, for non-small meat further processors, EPA set NSPS for total nitrogen equivalent to the BAT limitations based on Option 2.5 and for ammonia (as nitrogen) based on Option 2 (because Option 2.5 does not provide any additional ammonia removal). EPA did not revise the current NSPS for conventional pollutants.

13.2.4 Subcategory K (Poultry First Processing Facilities)

In 2002, EPA proposed a production threshold of 10 million pounds (live weight killed) per year for facilities in Subcategory K. EPA proposed this threshold to allow for different limitations for small and non-small poultry first processing facilities. EPA raised the production threshold for the final rule from 10 to 100 million pounds per year. Therefore, this section discusses small and non-small facilities separately. Costs presented in this section are presented in 1999 year dollars which is the base year of the survey.

13.2.4.1 Small Facilities in Subcategory K (Poultry first processors that slaughter less than or equal to 100 million pounds per year)

For the final rule, small poultry first processing facilities include facilities with production rates less than or equal to 100 million pounds per year (live weight killed). EPA is not establishing limitations for any existing small poultry first processing facilities in Subcategory K. However, EPA established new source performance standards for new facilities. The following sections discuss EPA's decision not to establish BPT, BCT, or BAT limitations and to establish NSPS for small direct discharge facilities in Subcategory K.

BPT/BCT/BAT Requirements

In 2002 EPA proposed new BPT/BCT/BAT for the small poultry first processors based on Option 1. EPA also evaluated Option 2 for small facilities in this subcategory. Based on comments on the proposal and the incorporation of data from the detailed surveys, EPA did not establish BPT/BCT/BAT limitations for small facilities in Subcategory K (poultry first processors) for the final rule.

First, even though Options 1 and 2 are available technologies (i.e., partial and more complete nitrification, respectively) readily applicable to all small facilities in Subcategory K, the cost of compliance with these limitations in relation to the effluent reduction benefits is disproportionate. For poultry first processor facilities with production rates less than or equal to 100 million pounds of live weight killed (LWK) per year EPA estimated it will cost \$1,487/lb of pollutant removed (1999 dollars) for Option 1 and \$501/lb (1999 dollars) for Option 2. These values significantly exceed the \$37/lb removed benchmark that EPA used, as guidance, to assess BPT cost reasonableness.

Consequently, EPA determined the total cost of effluent reductions using the Options 1 and 2 technologies are not reasonable in relation to the effluent reduction benefits. The Agency tried to avoid "double-counting" pollutant reductions that would occur if, for example, EPA summed removals of COD and BOD. Therefore, EPA used the sum of BOD₅ and ammonia (as nitrogen) removed to estimate the pounds of pollutant removed under the technology options for these facilities. As noted previously, EPA estimated this cost as \$1,487/lb removed for Option 1

and \$501/lb removed for Option 2. Second, EPA found that compliance with limitations based on Option 1 or Option 2 technology will result in at least 36 closures for the existing small direct dischargers for which facility-level financial data exists. EPA only had sufficient financial data for 9 out of an estimated 37 small facilities in this subcategory. Therefore, there may be more closures than we are able to project.

Existing small direct discharge facilities in Subcategory K will remain subject to permit limits based on the best professional judgment of the permit writer.

NSPS Requirements

For the 2002 proposal, EPA proposed new NSPS based on Option 1. In the NODA (68 FR 48500, August 13, 2003), EPA gave notice that it was considering the modified options (Option 2.5, Option 2.5+P, and no revision/no regulation) in addition to the proposed options (Options 1 and 2) for small slaughtering facilities. Based on comments received on the proposal and the completion of the review and incorporation of data from the detailed surveys, EPA established NSPS standards for small facilities in Subcategory K based on Option 2. There are no current new source performance standards for small poultry first processors and 75 percent of small facilities in EPA's database currently use Option 2 technology (or more advanced technology); therefore, Option 2 is demonstrated technology for this segment of facilities. However, EPA determined that the ratio of capital costs to total assets for the facilities in this subcategory to be 13 percent for both Option 1 and Option 2 technology levels. While 13 percent of average total assets is a significant level, EPA concluded that the limited amount of data for these facilities limited the analysis and the actual ratio of capital costs to total assets for new facilities may be much lower. For example, the analysis includes one facility whose ratio is greater than 30 percent, while another facility has a ratio of approximately 4 percent. Thus, since the barrier to entry test results are identical for Options 1 and 2, and 75 percent of existing facilities use Option 2 technology, EPA selected the more stringent Option 2 as the level of control for new sources for ammonia (as nitrogen) and the five conventional pollutants.

13.2.4.2 Non-small Facilities in Subcategory K (Poultry first processing facilities that slaughter more than 100 million pounds per year)

For non-small facilities in Subcategory K, EPA, for the first time, established limitations and standards for BOD₅, TSS, oil & grease, pH, fecal coliforms, ammonia (as nitrogen), and total nitrogen for existing and new sources. As discussed in Section 14, the new limitations and standards are concentration-based. The following sections discuss the technology bases EPA selected for the final rule for the direct discharge non-small facilities in Subcategory K.

BPT Requirements

In 2002 EPA proposed new BPT for the non-small poultry first processors (Subcategory K) based on Option 3 to control five conventional pollutants or pollutant parameters (BOD₅, TSS, oil & grease, fecal coliforms, and pH) and also control ammonia (as nitrogen), total nitrogen and total phosphorus. As discussed in the NODA, after review and evaluation of the revised and new data, EPA reconsidered its assessment of Option 3 technology.

EPA established BPT limitations for BOD₅, TSS, oil & grease, fecal coliforms, pH and ammonia (as nitrogen) for non-small direct dischargers in Subcategory K based on technology Option 2 (see Section 9 for additional details on the Option 2 technology).

The Agency concluded that the Option 2 treatment technology represents the best practicable control technology currently available and is the basis for the BPT limitations for these facilities for the following reasons.

First, this technology is available technology and is readily applicable to all non-small facilities in Subcategory K. More than 92 percent of the non-small direct discharging facilities in these subcategories are using Option 2 technology, or more advanced technology. Although most facilities have the components of Option 2 technology in place (e.g., nitrification basin/aerobic reactor), some facilities are not achieving the projected Option 2 long-term average concentrations (LTAs). EPA attributes this to their failure to operate or maintain the Option 2 technology adequately. (See Sections 10 and 11 for additional discussion of the cost and loading methodologies.) Consequently, when estimating the costs of compliance with Option 2, EPA

included costs for treatment optimization for a number of facilities to achieve the Option 2 LTA. For example, EPA included costs for increased aeration, chemical addition, sludge handling, process controls, in-process sampling, analytical testing, and capacity.

Second, the cost of compliance with these limitations in relation to the effluent reduction benefits is not disproportionate. EPA projected that compliance with BPT limitations based on Option 2 technology will not result in closures of existing non-small direct dischargers in these subcategories. Moreover, adopting this level of control will create a significant reduction in pollutants discharged into the environment. For poultry first processor facilities with production rates greater than 100 million pounds LWK per year using Option 2, EPA estimated an annual compliance cost of \$17.7 million (pretax, 1999 dollars) and removal of 980,000 pounds of BOD₅ and ammonia (as nitrogen) from current discharges into the Nation's waters at a cost of \$18.18/lb of pollutant removed (1999 dollars). This cost per pound of pollutant removed is below the \$37/lb benchmark that EPA is using, as guidance, to evaluate cost-reasonableness.

EPA considered Option 2.5 (which also includes partial denitrification) as the basis for BPT limitations. However, Option 2.5 does not remove any additional pounds of conventional pollutants or ammonia (as nitrogen) and costs \$9.4 million more annually than Option 2. In addition, EPA found that 45 percent of non-small facilities in this subcategory in EPA's database are using the components of Option 2.5 technology (e.g., facility has in place a denitrification basin, nitrification basin and disinfection) or more advanced technology. Because Option 2.5 costs more, does not remove additional pollutants, and is not as widely available as Option 2 technology, EPA did not select it as the basis of BPT limitations.

Furthermore, EPA did not select Option 2.5+P or Option 4 as the basis for BPT limitations, as they do not achieve adequate additional pollutant reductions as compared to their additional compliance costs. Specifically, Option 2.5+P does not achieve any additional removals of conventional pollutants or ammonia (as nitrogen) as compared to Option 2, but it would cost an additional \$45.7 million (in 1999 dollars) annually. Option 4 would remove an additional 170,000 pounds of ammonia (as nitrogen) for an additional \$91.4 million (in 1999 dollars) annually. Other options the Agency considered for BPT were not selected due to lack of

availability and/or poor BPT cost and removal comparison. Both the proposal and the NODA contain detailed discussions explaining why EPA rejected setting BPT limitations based on other technology (see 67 FR 8629, February 25, 2002 and 68 FR 48499, August 13, 2003).

BCT Requirements

In deciding whether to adopt more stringent limitations for BCT than BPT, EPA considered whether technologies other than those adopted for BPT will achieve greater removal of conventional pollutants and whether the costs of those technologies are reasonable under the standards established by the CWA. EPA generally refers to the decision criteria as the “BCT cost test.” EPA is promulgating BCT effluent limitations for conventional parameters (e.g., pH, TSS, O&G) equivalent to BPT for this subcategory because the Agency did not identify technologies that can achieve greater removals of conventional pollutants that also pass the BCT cost test. EPA evaluated adding a filter to the BPT technology (i.e., Option 2 + F) in order to get further conventional pollutant reductions. However, this technology option failed the BCT cost test. (For a more detailed description of the BCT cost test and details on EPA’s analysis, see the *Economic and Environmental Benefits Analysis of the Final Meat and Poultry Products Rule* [EPA-821-R-04-010]).

BAT Requirements

EPA proposed to establish the BAT level of regulatory control for non-small facilities in Subcategory K based on Option 3 (i.e., biological treatment, more complete nitrification, more complete denitrification and disinfection). As discussed in the NODA, after review and evaluation of the revised and new data, EPA reconsidered its assessment of Option 3 as BAT technology. EPA determined that Option 3 did not meet all the statutory criteria for BAT. The Agency refocused its evaluation for the technology basis for BAT on Option 2.5, Option 2.5+P or Option 4 for nutrient removal (see Section 9 for a description of the technology options). For the final rule, EPA based the BAT limitations for these facilities on Option 2.5 technology and promulgated a limitation for total nitrogen on this basis. However, EPA is setting a limitation for ammonia (as nitrogen) that is equal to BPT, because using Option 2.5 technology or higher does

not result in any additional ammonia removal than the technology used to establish BPT (Option 2).

The following section describes EPA's rationale for selecting Option 2.5 technology and rejecting Option 2.5+P and Option 4. The proposal and the NODA (see 67 FR 8629 and 68 FR 48499) contain detailed explanations why EPA rejected setting BAT limitations based on other technology options, and the Administrative Record for the final rule provides does not support EPA changing these conclusions.

EPA determined that Option 2.5 technology is available in Subcategory K, as 45 percent of the non-small facilities in this subcategory in EPA's database use the components of Option 2.5 (or more advanced technology) and is economically achievable. EPA estimated the compliance costs for Option 2.5 to be \$31.8 million (in 1999 dollars). Using the facility and company closure methodologies, EPA believes that no facilities or companies will close. For a sensitivity analysis, EPA also estimated closures using a less stringent decision rule (closure under one of three forecast methodologies rather than at least two of three). Using the alternate analysis, EPA estimated no facilities will close under Option 2.5.

EPA also considered nutrient removal cost-effectiveness when evaluating BAT options for this industry. For Option 2.5, EPA estimated 9.4 million pounds removed per year of total nitrogen and a nutrient cost-effectiveness of \$3.40/lb of total nitrogen removed. Because Option 2.5 does not include phosphorus removal, EPA did not calculate nutrient cost-effectiveness for phosphorus for Option 2.5. EPA concludes that Option 2.5 is nutrient cost-effective for total nitrogen.

EPA considered Option 2.5+P as the basis of BAT, but rejected it. Fourteen percent of non-small facilities in Subcategory K in EPA's database use Option 2.5+P technology (or more advanced technology). EPA estimated the pre-tax annualized cost of Option 2.5+P is \$63.4 million (1999 dollars), which is \$31.6 million more than Option 2.5. EPA estimated no facility closures and one company closure for Option 2.5+P (Note: Facilities that are owned by the company that is projected to close did not provide facility-level financial information; therefore, those facilities are not part of the facility-level analysis). Option 2.5+P removes 4.1 million

pounds per year of total phosphorus and achieves the same level of nitrogen and conventional pollutant reduction as Option 2.5. Therefore, EPA estimated the average nutrient cost-effectiveness to be \$6.77/lb/lb total nitrogen removed and \$15.28/lb total phosphorus removed. These values exceed the benchmark that EPA is using, as guidance, for cost-effectiveness. Therefore, EPA did not select Option 2.5+P due to the poor cost-effectiveness for nutrients.

EPA also considered, but did not select, Option 4 as the basis of BAT limitations due to the high increase in cost as compared to Option 2.5, the poor incremental nutrient cost-effectiveness (i.e., the high cost to remove additional nutrients as compared to Option 2.5+P), and high number of closures.

EPA estimated that almost 3 percent of direct discharge non-small facilities in this subcategory currently operate Option 4 technology (or more advanced technology). EPA estimated the pre-tax annualized compliance costs for Option 4 to be \$109.1 million (1999 dollars), which is \$45.7 million more than Option 2.5+P and \$77.3 million more than Option 2.5. EPA also estimated that Option 4 removes 20.9 million pounds per year of nitrogen (11.5 million more than Option 2.5 or Option 2.5+P) and 4.7 million pounds per year of phosphorus (about 520,000 pounds per year more than Option 2.5+P). However, EPA projects 22 facility closures and one company closure under Option 4 and estimated the average nutrient cost-effectiveness to be \$5.22/lb total nitrogen removed and \$23.35/lb total phosphorus removed. The incremental nutrient cost-effectiveness is \$6.71/lb of nitrogen removed (relative to Option 2.5) and \$87.17 /lb of phosphorus removed (relative to Option 2.5+P). Option 4 exceeds the \$4 /lb removed benchmark value for nitrogen and the \$10/lb removed benchmark value for phosphorus. Therefore, EPA finds that Option 4 is not cost-effective for total nitrogen or phosphorus removal and is not economically achievable technology.

EPA established BAT limitations for ammonia (as nitrogen) that are equivalent to the limitations it promulgated under BPT. EPA considered setting more stringent limitations for ammonia (as nitrogen) under BAT; however, the selected BAT technology option (Option 2.5) does not remove any additional quantity of ammonia (as nitrogen). Although Option 4 does

remove some additional pounds of ammonia (as nitrogen) as compared to Option 2, EPA did not select Option 4 for BAT for the reasons discussed earlier in this section.

NSPS Requirements

EPA considers the barrier to entry into the industry for a new facility that results from the compliance costs of the regulation and whether or not there are new source standards in place for the facilities. For this rule, EPA used the ratio of average capital costs to average total assets to measure the potential for barrier to entry due to the MPP rule. EPA estimated the ratio of costs to assets for Option 2.5, 2.5+P, and Option 4: they range from 4.0 percent for Option 2.5 to 4.2 percent for Option 2.5+P to 12.3 percent for Option 4. The estimates for Option 2.5+P and Option 4, however, do not reflect EPA's additional evaluation of the costs for chemical phosphorus based on comments EPA received (see DCN 300015). From this additional evaluation, EPA concludes that for non-small poultry first processors costs may be \$25,000 to \$106,000 more per facility for chemical phosphorus removal (including costs for additional sludge disposal) than those used in EPA's barrier to entry analysis, as discussed here. EPA was concerned that, with these additional costs, the ratio may rise to a level that the Agency would consider to be a barrier to entry for Option 2.5+P and Option 4. Therefore, EPA set standards for new sources equivalent to the BAT limitations established by the final rule (based on Option 2.5 technology) for total nitrogen and equivalent to BPT (based on Option 2 technology) for ammonia (as nitrogen) and the five conventional pollutants.

13.2.5 Subcategory L (Poultry Further Processing Facilities)

In 2002 EPA proposed a production threshold of 7 million pounds (finished product) per year for facilities in Subcategory L. EPA proposed this threshold to allow for different limitations for small and non-small poultry further processing facilities. EPA is retaining the proposed threshold for the final rule. Therefore, this section discusses small and non-small facilities separately. Costs presented in this section are presented in 1999 year dollars which is the base year of the survey.

13.2.5.1 Small Facilities in Subcategory L (poultry further processing facilities that produce less than or equal to 7 million pounds per year)

For the final rule, small poultry first processing facilities include facilities with production rates less than or equal to 7 million pounds (finished product) per year. EPA did not establish limitations for any existing small poultry further processing facilities in Subcategory L. However, EPA established new source performance standards for new facilities. The following sections discuss EPA's decision not to establish BPT, BCT, or BAT limitations and to establish NSPS for small direct discharge facilities in Subcategory L.

BPT/BCT/BAT Requirements

In 2002, EPA proposed new BPT/BCT/BAT for the small poultry further processors based on Option 1. EPA also evaluated Option 2 for small facilities in this subcategory. Based on incorporation of data from the detailed surveys, EPA did not establish BPT/BCT/BAT limitations for small facilities in Subcategory K (poultry first processors) for the final rule for the following reasons.

First, even though Option 1 and Option 2 are available technologies (i.e., partial and more complete nitrification, respectively) readily applicable to all small facilities in Subcategory L, the cost of compliance with these limitations in relation to the effluent reduction benefits is disproportionate. For poultry further processor facilities with production rates less than or equal to 7 million pounds of live weight killed (LWK) per year EPA estimated it will cost approximately \$74/lb of pollutant removed (1999 dollars) for Option 1 or Option 2, which exceed the \$37/lb removed benchmark that EPA is using, as guidance, to evaluate BPT cost-reasonableness.

Consequently, EPA determined the total cost of effluent reductions using the Option 1 or Option 2 technology is not reasonable in relation to the effluent reduction benefits. Second, due to lack of facility-level financial data, EPA could not estimate closures that would result with BPT limitations based on Option 1 or Option 2 technology. In addition, the analysis of financial data for small facilities in Subcategory L was complicated by the fact that some facilities performing operations fitting within the scope of Subcategory L also perform operations that are

regulated under Subcategories F through I (meat further processors). (See the *Economic and Environmental Benefits Analysis of the Final Meat and Poultry Products Rule* [EPA-821-R-04-010] for a discussion of how “mixed processors” were addressed.) Existing small direct discharge facilities in Subcategory L will remain subject to permit limits based on the best professional judgment of the permit writer.

NSPS Requirements

In 2002, EPA proposed new NSPS for small poultry further processors (Subcategory L) based on Option 1. In the NODA (68 FR 48500, August 13, 2003), EPA gave notice that it was considering the modified options (Option 2.5, Option 2.5+P, and no revision/no regulation) in addition to the proposed options (Option 1 and Option 2) for these facilities. After considering comments and the data from the detailed surveys, EPA established NSPS standards for small poultry further processing facilities based on Option 2. EPA determined that all existing small poultry further processors in EPA’s database currently use the components of Option 2 technology, although, as noted above, they would incur additional costs to meet the Option 2 LTAs. In addition, EPA determined that there is no barrier to entry for either Option 1 or Option 2 as the ratio of capital costs to total assets for the facilities in this subcategory is 0.4 percent for both Option 1 and Option 2 technology levels. Finally, there are no current new source performance standards in place for small facilities in Subcategory L. Since the barrier to entry test results are identical for Options 1 and 2, and all existing facilities have the components in place for Option 2 technology, EPA selected the more stringent Option 2 as the level of control for new sources for ammonia (as nitrogen) and the five conventional pollutants.

13.2.5.2 Non-small Facilities in Subcategory L (Poultry further processing facilities that produce more than 7 million pounds per year)

For non-small facilities in Subcategory L, EPA, for the first time, established limitations and standards for BOD₅, TSS, oil & grease, pH, fecal coliforms, ammonia (as nitrogen), and total nitrogen for existing and new sources. As discussed in Section 14, the new limitations and standards are concentration-based. The following sections discuss the technology bases EPA

selected for the final rule for the direct discharge non-small facilities in Subcategory L (poultry further processors).

BPT Requirements

In 2002 EPA based its proposal for new BPT for the poultry further processors (Subcategory L) on Option 3 to control five conventional pollutants or pollutant parameters (BOD₅, TSS, oil and grease, fecal coliforms, and pH) and also control ammonia (as nitrogen), total nitrogen and total phosphorus. As discussed in the NODA, after review and evaluation of the revised and new data, EPA reconsidered its assessment of Option 3 technology.

EPA decided to establish BPT limitations for BOD₅, TSS, oil & grease (as HEM), fecal coliforms, pH and ammonia (as nitrogen) for non-small direct dischargers in Subcategory L based on technology Option 2 (see Section 9 for additional details on the Option 2 technology).

The Agency concluded that the Option 2 treatment technology is the best practicable control technology currently available, and it should be the basis for the BPT limitations for these facilities. First, this technology is available and readily applicable to all non-small facilities in Subcategory L. EPA estimated that all non-small direct discharge facilities in this subcategory currently operate Option 2 technology (or more advanced technology).

Second, the cost of compliance with these limitations in relation to the effluent reduction benefits is not disproportionate. For poultry further processing facilities with production rates greater than 7 million pounds finished product per year, EPA estimated an annual compliance cost under Option 2 of \$557,000 (pretax 1999 dollars) and 18,600 pounds of BOD₅ and ammonia (as nitrogen) removed from current discharges at a cost of \$29.88/lb (1999 dollars) of pollutant removed. In estimating the pounds of pollutant removed based on Option 2 technology for these facilities, EPA used the sum of BOD₅ and ammonia (as nitrogen) removed. The cost per pound removed approaches, but is still below, the \$37 /lb value that EPA uses as guidance in evaluating BPT cost-reasonableness.

EPA considered Option 2.5 (which also includes partial denitrification) as the basis for BPT limitations. However, Option 2.5 does not remove any additional pounds of conventional

pollutants or ammonia (as nitrogen) compared to Option 2 but costs almost \$426,000 more annually. In addition, EPA found that Option 2.5 technology is not as widely available as Option 2 technology. That is, 37 percent of non-small poultry further processors in EPA's database use Option 2.5 (or more advanced) technology, while 100 percent use Option 2 (or more advanced) technology. Thus, EPA did not select Option 2.5 as the basis of BPT limitations.

Furthermore, EPA did not select either Option 2.5+P or Option 4 as the basis for BPT limitations because they do not achieve adequate pollutant reductions relative to additional compliance costs. Specifically, Option 2.5+P does not achieve any additional removals of conventional pollutants or ammonia (as nitrogen) but would cost \$918,000 more each year than Option 2. Option 4 would remove an insignificant amount of ammonia (as nitrogen) for an additional \$2.7 million annually. EPA did not select other options it considered for BPT due to lack of availability and poor BPT cost and removal comparison. The 2002 proposal and the NODA (see 66 FR 457 and 68 FR 48499) contain detailed explanations of why EPA rejected BPT limitations based on other BPT technology options.

BCT Requirements

In deciding whether to adopt more stringent limitations for BCT than BPT, EPA considered whether there are technologies other than those adopted for BPT that achieve greater removals of conventional pollutants and whether those technologies are cost-reasonable under CWA standards. EPA generally refers to the decision criteria as the "BCT cost test." EPA promulgated effluent limitations for conventional parameters (e.g., pH, TSS, O&G) equivalent to BPT for this subcategory because it identified no technologies achieving greater removals of conventional pollutants that also pass the BCT cost test. EPA considered adding a filter to the BPT technology (i.e., Option 2 + F) to get further conventional pollutant reductions; however, this technology option failed the BCT cost test. For a more detailed description of the BCT cost test and details on EPA's analysis, see the *Economic and Environmental Benefits Analysis for the Final Meat and Poultry Products Rule* (EPA-821-R-04-010).

BAT Requirements

EPA proposed to establish the BAT level of regulatory control for non-small facilities in Subcategory L based on Option 3 (biological treatment, more complete denitrification, more complete nitrification, and disinfection). As discussed in the NODA, after review and evaluation of the revised and new data, EPA reconsidered its assessment of Option 3 as BAT technology. EPA determined that Option 3 did not meet all the statutory criteria for BAT. The Agency refocused its evaluation for the technology basis for BAT on Option 2.5, Option 2.5+P or Option 4 for nutrient removal (see Section 9 for a description of the technology options). For the final rule, EPA bases the BAT limitations for these facilities on Option 2.5 technology and promulgated a limitation for total nitrogen on this basis. EPA is, however, setting a limitation for ammonia (as nitrogen) that is equal to BPT.

The following section describes EPA's rationale for selecting Option 2.5 technology and rejecting Options 2.5+P and 4. The proposal and the NODA (see 67 FR 8629 and 68 FR 48499) contain detailed explanations why EPA rejected setting BAT limitations based on other technology options, and the Administrative Record for the final rule does not support EPA changing these conclusions.

EPA selected Option 2.5 technology as the basis of BAT for non-small facilities in Subcategory L for two reasons. First, Option 2.5 technology has been demonstrated as available in Subcategory L. EPA estimated that 37 percent of non-small direct discharge facilities in this subcategory in EPA's database currently operate at or above the Option 2.5 technology level. Second, Option 2.5 is economically achievable. EPA estimated the compliance costs (pre-tax, 1999 dollars) for Option 2.5 to be \$983,000 per year. Using the closure methodology, there is a slight probability (0.9 percent) that there could be one facility closure under Option 2.5.

EPA also considered nutrient removal cost-effectiveness when evaluating BAT options for this industry. For Option 2.5, EPA estimated 146,000 pounds removed per year of total nitrogen and a nutrient cost-effectiveness of \$6.71/lb total nitrogen removed. Option 2.5 does not include phosphorus removal; therefore, EPA did not calculate nutrient cost-effectiveness for phosphorus for Option 2.5. For the subcategory, Option 2.5 exceeds the \$4/lb removed value

EPA uses as guidance for nitrogen cost-effectiveness, but the cost-effectiveness for the rule as a whole does not exceed the \$4 /lb value. Therefore, Option 2.5 is cost-effective for total nitrogen.

EPA considered Option 2.5+P as the basis of BAT but rejected it. EPA estimated that 9 percent of the non-small poultry further processors use Option 2.5 (or more advanced) technology with phosphorus removal. The pre-tax annualized cost of Option 2.5+P is \$1.5 million (1999 dollars) and the probability of a facility level closure is less than 1.4 percent (i.e., at most one facility closure). Option 2.5+P removes 25,000 pounds per year of total phosphorus and achieves the same level of nitrogen and conventional pollutant reduction as Option 2.5. Therefore, EPA estimated the average nutrient cost-effectiveness to be \$10.08 /lb total nitrogen and \$58.98 /lb total phosphorus removed. Therefore, EPA did not select Option 2.5+P due to the poor cost-effectiveness for both total nitrogen and total phosphorus.

EPA also considered Option 4 as the basis of BAT but did not select it due to the high increase in cost compared to Option 2.5 and the poor nutrient cost-effectiveness (i.e., the high cost to remove additional nutrients compared to Option 2.5+P).

Nine percent of non-small direct discharge facilities in this subcategory operate Option 4 technology (or more advanced technology). Therefore, EPA considers the technology to be available. EPA estimated the pre-tax annualized compliance costs for Option 4 to be \$3.3 million (1999 dollars), which is \$1.8 million more than Option 2.5+P and \$2.3 million more than Option 2.5. Option 4 removes 354,000 pounds per year of nitrogen (208,000 more than Options 2.5 or 2.5+P) and 27,000 pounds per year of phosphorus (approximately 2,000 more pounds per year than Option 2.5+P). There is a 3 percent probability of a facility-level closure for Option 4 (at most one facility closure) and a ratio of 16.8 percent when comparing annualized compliance costs to net income. EPA considers this cost to revenue ratio high and an indication that Option 4 is not economically achievable for non-small facilities in Subcategory L. Finally, the incremental nutrient cost-effectiveness for nitrogen (as compared to Option 2.5) is \$11 /lb total nitrogen removed and for phosphorus (as compared to Option 2.5+P) is \$902 /lb total phosphorus removed. Therefore, EPA finds that Option 4 is not nutrient cost-effective for total nitrogen or total phosphorus removal and is not economically achievable.

EPA established BAT limitations for ammonia (as nitrogen) that are equivalent to the limitations it promulgated under BPT. EPA considered setting more stringent limitations for ammonia (as nitrogen) under BAT; however, the selected BAT option (Option 2.5) does not remove any additional quantity of ammonia (as nitrogen). Although Option 4 does remove some additional pounds of ammonia (as nitrogen) as compared to Option 2, EPA did not select Option 4 for BAT for the reasons discussed earlier in this section.

NSPS Requirements

For this rule, EPA used the ratio of average capital costs to average total assets to measure the potential barrier to entry due to the MPP rule. However, several non-small facilities in Subcategory L also perform operations that fall under the scope of Subcategories F through I. This complicates the analysis of the barrier to entry data. EPA estimated the ratio of costs to assets for Option 2.5, Option 2.5+P, and Option 4 for non-small poultry further processing facilities (Subcategory L). The ratios range from 0.1 percent for Option 2.5 and Option 2.5+P to 0.6 percent for Option 4. The estimates for Option 2.5+P and Option 4, however, do not reflect EPA's additional evaluation of the costs for chemical phosphorus based on comments EPA received (see DCN 300015). EPA performed an analysis using increased quantities of alum for chemical phosphorus removal for the detailed survey respondents (i.e., non-small meat and poultry slaughterers). From this additional evaluation, EPA concludes that costs for poultry slaughterers may be between 2 percent and 43 percent more per facility for chemical phosphorus removal (including increased sludge disposal) than those used in EPA's barrier to entry analysis, as discussed here. EPA was concerned that, with similar additional costs, the ratio for further processors may rise to a level that the Agency would consider to be a barrier to entry for Option 2.5+P and Option 4. Based on these results, EPA decided to establish standards for new sources equivalent to the BAT limitations based on Option 2.5 technology for total nitrogen and equivalent to BPT (based on Option 2) for ammonia (as nitrogen) and the five conventional pollutants.

13.2.6 Subcategory J (Independent Renderers)

Currently section 432.101(b) defines a renderer subject to the guidelines limitations as “an independent or off-site rendering operation ...which manufactures at rates greater than 75,000 pounds of raw material per day [or 19.5 million pounds per year based on 260 work days].” In 2002 EPA proposed to lower the production threshold to 10 million pounds per year based on a review of the available data at that time (i.e., screener survey data). EPA selected the threshold to design model facilities for use in estimating costs, pollutant loadings, non-water quality impacts, and economic impacts for the proposed rule. EPA promulgated this production threshold of 10 million pounds per year. There were no comments opposing this change in the threshold. Facilities that manufacture at rates less than or equal to 10 million pounds per year will remain out of the scope of 40 CFR part 432, while facilities above the threshold will be covered by the final regulation. EPA has not identified any additional direct discharging rendering facilities producing at rates between 10 million and 19.5 million pounds per year in its database.

For facilities in Subcategory J, EPA established limitations and standards for total nitrogen for existing and new sources. EPA did not revise the current limitations (BPT/BCT) or new source performance standards (NSPS) for conventional pollutants and did not revise the current BAT limitations or NSPS for ammonia (as nitrogen). The current regulations include production-based limitations and standards for these facilities for BOD₅, TSS, oil & grease, pH, fecal coliforms and ammonia (as nitrogen). As discussed in Section 14, the new limitations and standards are concentration-based. The following sections discuss the technology bases EPA selected for the final rule for the direct discharge facilities in Subcategory J.

BPT Requirements

EPA established BPT for Subcategory J (Renderers) in 1975, based on biological treatment (e.g., aerobic and anaerobic treatment) to control five conventional pollutants or pollutant parameters (BOD₅, TSS, oil and grease, fecal coliforms, and pH). The current limitations for ammonia (as nitrogen) for non-small meat further processors are contained in BAT and not BPT. Therefore, this section does not discuss BPT limitations for ammonia (as nitrogen). In February 2002 EPA proposed new BPT limitations for COD based on Option 2 in

an effort to better reflect current BPT treatment technology for renderers (67 FR 8630, February 25, 2002). See Section 7.3.2 for a discussion on why EPA is not establishing BPT limitations for COD in the final rule.

EPA did not propose revising BPT limitations for conventional pollutants. Therefore, EPA did not revise the conventional pollutant limitations for independent rendering facilities (Subcategory J) in the final rule and such facilities will remain subject to the BPT limitations in section 432.102.

BCT Requirements

In deciding whether to adopt more stringent limitations for BCT than BPT, EPA considered technologies that might achieve greater removals of conventional pollutants than those adopted for BPT. EPA also looked at whether those technologies are cost-reasonable under the standards established by the CWA. EPA generally refers to the decision criteria as the “BCT cost test.”

EPA did not promulgate new BPT effluent limitations for conventional parameters (*i.e.*, pH, BOD₅, TSS, oil and grease, and fecal coliforms) for independent rendering facilities (Subcategory J). Therefore, when considering a technology that would achieve greater removals of conventional pollutants than adopted for BPT, EPA compared the removals achievable through implementation of the Option 2 technology (which EPA considered as the possible technology basis for BCT) to current BPT limitations. EPA estimated that Option 2 removes approximately 34,000 pounds more per year of BOD₅ compared to conventional pollutant reductions by facilities meeting or exceeding current BPT limitations. There are no additional removals of TSS, O&G, or fecal coliforms.

EPA evaluated Option 2 under the BCT cost test and it failed (see the *Economic and Environmental Benefits Analysis of the Final Meat and Poultry Products Rule* (EPA 821-R-04-010)). For the final rule, EPA did not evaluate other technology options, such as Option 2 + F (Option 2 plus the addition of a filter), because they are more costly and do not remove significantly more conventional pollutants than Option 2. Therefore, if Option 2 did not pass,

these more expensive options would not pass the BCT cost test. The Agency did not identify any technologies that pass the BCT cost test and achieve greater removals of conventional pollutants than the current BPT technology. Thus, EPA did not revise the BCT limitations for these facilities. Independent rendering facilities in Subcategory J will remain subject to the current BCT limitations (which are equivalent to the current BPT limitations for conventional pollutants) in section 432.107.

BAT Requirements

EPA proposed to establish the BAT level of regulatory control for independent renderers (Subcategory J) based on Option 2 and took comment on other options in the NODA. For the final rule, EPA is basing the BAT limitations for these facilities on Option 2.5 technology and promulgated a limitation for total nitrogen on this basis. EPA did not revise the current BAT limitation for ammonia (as nitrogen).

EPA evaluated whether revising the current BAT limitation for ammonia (as nitrogen) based on Option 2, Option 2.5, Option 2.5+P, or Option 4 treatment technologies could be supported. When evaluating revision of BAT for non-conventional pollutants that are not nutrients, EPA not only considers whether the technology option is available and economically achievable, but also whether it is best. EPA typically evaluates a technology's cost-effectiveness as a factor in its decision. When considering cost-effectiveness (except for nutrients), EPA typically evaluates the additional pollutant reductions (in toxic pound-equivalents).

EPA estimated the annualized cost of each technology option under review. The approximate annualized cost of the technology options ranged from \$628,000 for Option 2 to \$10.2 million for Option 4 (pre-tax, 1999 dollars). Using the closure methodology, there is a slight probability (no more than 3.3 percent) that there could be one facility closure under Options 2, 2.5, and 2.5+P and one closure under Option 4. However, the average toxic cost-effectiveness numbers range from \$4,100 per toxic pound-equivalent (\$1981) for Option 2 to \$29,000 per toxic pound-equivalent (\$1981) for Option 4. These high values are due to the very minimal incremental reduction in toxic pound-equivalents (i.e., 90 toxic pound-equivalents/year for Option 2, 2.5, or 2.5+P and 205 toxic pound-equivalents/year for Option 4) and the high

incremental cost. EPA typically uses \$200 per toxic pound-equivalents (in 1981 dollars) as an indication of cost-effectiveness for toxic pollutants. Therefore, EPA determined that Options 2, 2.5, 2.5+P, and 4 are a not cost-effective basis for revising current ammonia (as nitrogen) limitations for independent renderers in Subcategory J when compared with those currently being achieved.

The following section describes EPA's rationale for selecting Option 2.5 technology and rejecting Option 2.5+P and Option 4 as the basis of BAT limitations for nutrients. EPA did not consider Option 2 for control of nutrients as it is not designed to reduce total nitrogen or total phosphorus. Both the proposal and the NODA contain detailed discussions explaining why EPA rejected setting BAT limitations based on other technology (see 67 FR 8629; February 25, 2002 and 68 FR 48499; August 13, 2003). EPA did not propose Option 3 for facilities in Subcategory J based on concerns over the economic impact and nitrogen cost-effectiveness estimated for the proposed rule. However, as discussed in Section 3 of this document and the NODA (68 FR 48476; August 13, 2003), EPA incorporated a significant amount of information into its analyses since proposal. This includes surveys from independent rendering facilities and comments from a trade association representing independent rendering facilities. In light of that data and information, EPA now finds a technology option that includes some denitrification (Option 2.5) is economically achievable and nutrient cost-effective for total nitrogen for independent rendering facilities.

EPA selected Option 2.5 technology as the basis of BAT limitations for total nitrogen for total nitrogen for independent rendering facilities because it is demonstrated as available and is economically achievable. First, Option 2.5 technology has been demonstrated as available in Subcategory J as 38 percent of facilities in EPA's database use components of Option 2.5 technology (or more advanced technology).

Second, Option 2.5 is economically achievable. EPA estimated the pre-tax annualized compliance costs (in 1999 dollars) for Option 2.5 to be \$2.8 million. Using the facility and company closure methodologies, EPA estimated a 1.3 percent probability of facility-level closure (i.e., at most one facility closure).

EPA also considered the cost-effectiveness of nutrient removal when evaluating BAT options for this industry segment. For Option 2.5, EPA estimated 1.5 million pounds removed per year of total nitrogen and the nutrient cost-effectiveness to be \$1.92/lb of total nitrogen removed. Because Option 2.5 does not include phosphorus removal, EPA did not calculate nutrient cost-effectiveness for phosphorus for Option 2.5. EPA concludes that Option 2.5 is nutrient cost-effective for total nitrogen.

EPA considered Option 2.5+P as the basis of BAT, but rejected it for the following reasons. Option 2.5+P costs \$7.4 million annually for 1.5 million pounds of total nitrogen reduction per year (i.e., the same reduction of total nitrogen as Option 2.5) and 590,000 pounds of total phosphorus reduction per year. Therefore, the average nitrogen cost-effectiveness for Option 2.5+P is \$5.06/lb of total nitrogen removed and the average phosphorus cost-effectiveness is \$12.59/lb of total phosphorus removed. The nutrient cost-effectiveness values for nitrogen and phosphorus exceed the benchmarks that EPA uses; therefore, EPA did not select Option 2.5+P.

EPA considered Option 4 as the basis of BAT but did not select it due to the lack of availability of the technology option, the high increase in cost compared to Option 2.5, and the poor incremental nutrient cost-effectiveness (i.e., the high cost to remove additional nutrients compared to Option 2.5+P).

Based on its database, EPA estimated that there are no facilities in this subcategory currently operating Option 4 technology. In addition, EPA estimated the pre-tax annualized compliance costs for Option 4 to be \$10.2 million (1999 dollars), which is \$7.4 million more than Option 2.5. EPA estimated that Option 4 removes approximately 1.7 million pounds per year of total nitrogen (200,000 more than Option 2.5) and 620,000 pounds per year of total phosphorus (30,000 more than Option 2.5+P). Using the facility and company closure methodologies, EPA estimated a 4.8 percent probability of facility-level closure (i.e., 1 facility closure). Finally, EPA estimated the incremental nutrient cost-effectiveness to be \$40/lb of total nitrogen removed (compared to Option 2.5) and \$85/lb of total phosphorus removed (compared to Option 2.5+P). The nutrient cost-effectiveness of Option 4 is well above the \$4/lb total

nitrogen removed and \$10/lb total phosphorus removed benchmarks and therefore, EPA does not consider Option 4 to be cost-effective.

NSPS Requirements

In 2002, EPA proposed to revise the current new source performance standards for independent rendering facilities in Subcategory J based on Option 2 technology. As discussed in the NODA, with the development of Option 2.5, EPA reconsidered technology basis for all subcategories (68 FR 48500; August 13, 2003). EPA selected Option 2.5 technology as the basis for BAT limitations; therefore, EPA did not consider Option 2 technology (a less stringent technology) as the basis for NSPS for the final rule. EPA estimated the ratio of costs to assets for Options 2.5, 2.5+P and Option 4. The ratios are: 0.3 percent for Option 2.5, 0.4 percent for Option 2.5+P, 0.5 percent for Option 4. The estimates for Option 2.5+P and Option 4, however, do not reflect EPA's additional evaluation of the costs for chemical phosphorus based on comments EPA received (see DCN 300,025). EPA performed an analysis using increased quantities of alum for chemical phosphorus removal for the detailed survey respondents (i.e., non-small meat and poultry slaughterers). From this additional evaluation, EPA concludes that the average costs for meat and poultry slaughterers may be between 4 and 26 percent more per facility for chemical phosphorus removal (including increased sludge disposal) than those used in EPA's barrier to entry analysis, as discussed here. EPA is concerned that, with similar additional costs, the ratio for independent renderers may rise to a level that the Agency would consider to be a barrier to entry for Option 2.5+P and Option 4.

Although this subcategory does have current NSPS, they do not include limitations for total nitrogen. Therefore, EPA established NSPS for total nitrogen based on Option 2.5 technology. EPA did not revise NSPS for ammonia (as nitrogen) or for the conventional pollutants.