

2. Cost Effectiveness of Nitrogen and Phosphorus Removals

The tables in this section provide both the incremental and average nutrient cost-effectiveness values. As a basis of comparison, EPA estimated that the average cost-effectiveness of nutrient removal by POTWs with biological nutrient removal to be \$4/lb for nitrogen and \$10/lb for phosphorus (67 FR 8622). EPA notes that Table X.B-2 displays the results for the nitrogen cost-effectiveness and, therefore, includes only options specifically designed to remove total nitrogen (*i.e.*, Option 2.5 and Option 4). Similarly, Table X.B-3 displays the results for the phosphorus cost-effectiveness and, therefore, only includes those options with a chemical

phosphorus treatment step (*i.e.*, Option 2 + P and Option 4). Option 2.5 + P is also omitted from Table X.B-2 and Table X.B-3 because it provides no additional Total N removals relative to Option 2.5 and no additional Total P removals relative to Option 2 + P, respectively. Average cost-effectiveness (cost per pound of nitrogen removed) ranges from \$0.45 (Option 2.5) to \$1.52 (Option 4) in Subcategories A through D, and from \$4.65 (Option 2.5) to \$5.78 per pound (Option 4) in Subcategory K. The incremental cost-effectiveness from Option 2.5 to Option 4 is \$9.68/pound of nitrogen removed for Subcategories A-D and \$6.14/pound nitrogen removed for Subcategory K. Average cost-effectiveness (cost per pound of phosphorus removed) ranges from \$6.94

(Option 2+P) to \$8.41 (Option 4) in Subcategories A through D, and from \$10.18 (Option 2+P) to \$19.10 per pound (Option 4) in Subcategory K. The incremental cost-effectiveness from Option 2 + P to Option 4 is \$22.70/pound of phosphorus removed for Subcategories A-D and \$83/pound phosphorus removed for Subcategory K. EPA notes that the nutrient cost-effectiveness numbers presented below represent upper bounds because they assign all the costs for an option to either Total N or Total P removal even though the options also remove other pollutants. EPA used this approach to provide a conservative estimate of cost-effectiveness and because it does not have a good basis to divide up removal costs among pollutants.

TABLE X.B-2.—NUTRIENT COST-EFFECTIVENESS: TOTAL NITROGEN

Option	Pre-tax annualized costs (1999\$)	Pounds removed	Average cost effectiveness (1999\$/pound)	Incremental cost effectiveness (1999\$/pound)
Subcategories A through D				
Baseline	\$0	0	NA	NA
Option 2.5	12,359,499	27,688,678	\$0.45	\$0.45
Option 4	47,626,564	31,331,318	1.52	9.68
Subcategory K				
Baseline	0	0	NA	NA
Option 2.5	16,328,846	3,509,950	4.65	4.65
Option 4	83,368,375	14,427,113	5.78	6.14

TABLE X.B-3.—NUTRIENT COST-EFFECTIVENESS: TOTAL PHOSPHORUS

Option	Pre-tax annualized costs (1999\$)	Pounds removed	Average cost effectiveness (1999\$/pound)	Incremental cost effectiveness (1999\$/pound)
Subcategories A through D				
Baseline	\$0	0	NA	NA
Option 2 + P	35,573,746	5,128,793	\$6.94	\$6.94
Option 4	47,626,564	5,659,799	8.41	22.70
Subcategory K				
Baseline	0	0	NA	NA
Option 2 + P	38,998,615	3,830,011	10.18	10
Option 4	83,368,375	4,363,815	19.10	83

C. Results of Barrier to Entry Analysis for New Sources

As discussed in Section X.D, when establishing the NSPS level of control, EPA considers the barrier that compliance costs due to the effluent guidelines regulation pose to entry into the industry for a new facility. The barrier to entry analysis compares estimated average incremental facility or company capital costs incurred to meet the effluent guidelines to average total assets of existing facilities. Tables X.C-

1 and X.C-2, below, provide the results of the facility level and company level ratios. The facility level ratio of capital costs to total assets ranges from 0.1 percent under Option 2 to 2.1 percent under Option 4 in Subcategories A through D, and from 0.4 percent under Option 2 to 7.8 percent under Option 4 in Subcategory K. Average capital costs of \$3.0 million per facility in Subcategories A through D result in a 2.1 percent ratio and average capital costs of \$3.1 million per facility in

Subcategory K result in a 7.8 percent ratio. The company level ratio of capital costs to total assets ranges from 0.02 percent under Option 2 to 0.3 percent under Option 4 for red meat, and from 0.1 percent under Option 2 to 1.7 percent under Option 4 for poultry companies. EPA notes that companies may own both red meat and poultry facilities across more than one subcategory. Poultry companies show the larger impacts as compared to red meat and mixed meat companies.