

CHAPTER 6

REGULATORY OPTIONS: DESCRIPTIONS, COSTS, AND CONVENTIONAL REMOVALS

6.1 PROPOSED SUBCATEGORIES AND OPTIONS

Table 6-1 summarizes the options evaluated for each subcategory. The Best Management Practices (BMP) plan listed for Option 1 addresses solids control. The drugs and chemicals BMP listed for Options 2 and 3 addresses general reporting requirements for drug and chemical use.

**Table 6-1
Regulatory Options**

Option	Subcategory		
	Flow-through	Recirculating	Net Pens
1	Sedimentation Basin Quiescent Zone BMP plan Compliance Monitoring	Sedimentation Basin Quiescent Zone BMP plan Compliance Monitoring	Feed Management BMP plan
2	Option 1 plus Drugs & Chemical BMP	Option 1 plus Drugs & Chemical BMP	Option 1 plus Drugs & Chemical BMP
3	Option 2 plus Solids Polishing	Option 2 plus Solids Polishing	Option 2 plus Active Feed Monitoring

6.2 SUBCATEGORY COSTS

EPA first examined subcategory costs for all facilities meeting the definition of “concentrated aquatic animal production facilities” that need an NPDES permit under 40 CFR 122.24 and Appendix C. These are summarized in Table 6-2. The annual operating and maintenance (O&M) costs are comparable in order of magnitude to the combined capital and one-time costs, such as equipment, for all

subcategories. Total pre-tax annualized costs for Options 1 to 3 are estimated to be: \$510,000 to \$930,000 for flow-through systems excluding Alaska; \$440,000 to \$510,000 for flow-through systems in Alaska; \$31,000 to \$45,000 for recirculating systems; and \$6,200 to \$34,000 for net pen systems.

**Table 6-2
Option Costs by Subcategory (\$2000)**

Subcategory	Option	Capital and One time cost	Annual O&M Cost	Pre-tax Annualized Costs
Flow-through	1	\$750,000	\$418,000	\$506,000
	2	\$860,000	\$444,000	\$545,000
	3	\$1,653,000	\$727,000	\$925,000
Flow-through Alaska Nonprofits	1	\$765,000	\$350,000	\$441,000
	2	\$796,000	\$358,000	\$453,000
	3	\$941,000	\$400,000	\$513,000
Recirculating	1	\$6,000	\$31,000	\$30,000
	2	\$15,000	\$33,000	\$34,000
	3	\$47,000	\$40,000	\$45,000
Net Pens	1	\$7,000	\$5,000	\$6,000
	2	\$16,000	\$7,000	\$9,000
	3	\$66,000	\$26,000	\$34,000

Note: Numbers rounded to nearest \$1,000.

Source: 30 May costs for Flow-through Medium facilities.

16 May costs for Large Flow-through facilities, Recirculating, and Net Pen Systems.

23 May 2002 costs for Alaska facilities.

EPA performed several rounds of costing analysis as it developed the effluent guideline. In March 2002, EPA developed compliance cost estimates for the six revenue size categories used by USDA in its *Census* (see Chapter 2, Table 2-8 and USDA, 2000). Based on the estimated impacts for each category using the revenue tests, EPA set three production levels:

- below 100,000 pounds per year
- 100,000 to 475,000 pounds per year
- more than 475,000 pounds per year

Appendix C provides more details on this early analysis. EPA is not proposing effluent limitations guidelines for CAAP facilities with production below 100,000 pounds per year.

The flow-through subcategory has the largest number of facilities (120 including Alaskan nonprofit facilities, 102 excluding Alaska). EPA estimated the compliance costs for two different size groups within the subcategory: (1) from 100,000 to 475,000 pounds of annual production, and (2) 475,000 pounds or greater of annual production. Table 6-3 summarizes the cost information by size.

**Table 6-3
Flow-through Systems:¹ Cost by Annual Production (\$2000)**

Size	Option	Capital and One Time Cost	Annual O&M	Pre-tax Annualized Costs
100,000 to 475,000 Pounds	1	\$558,000	\$372,000	\$435,000
	2	\$652,000	\$394,000	\$469,000
	3	\$1,319,000	\$649,000	\$805,000
475,000 Pounds and Greater	1	\$192,000	\$46,000	\$70,000
	2	\$208,000	\$50,000	\$76,000
	3	\$333,000	\$78,000	\$120,000

¹ Excluding Alaskan facilities.
Note: Numbers rounded to nearest \$1,000.

6.3 COST OF PROPOSED OPTIONS

EPA is proposing the following options:

- Flow-through systems (BPT/BCT/BAT/NSPS)
 - Facilities with less than 100,000 pounds annual production: no regulation
 - Facilities with annual production with 100,000 pounds or more and less than 475,000 pounds: Option 1
 - Facilities with 475,000 pounds and greater annual production: Option 3
- Recirculating systems (BPT/BCT/BAT/NSPS)
 - Facilities with less than 100,000 pounds annual production: no regulation
 - Facilities with 100,000 pounds and greater annual production: Option 3
- Net Pen systems (BPT/BCT/BAT/NSPS)
 - Facilities with less than 100,000 pounds annual production: no regulation
 - Facilities with 100,000 pounds and greater annual production: Option 3

An analysis of potential costs and impacts to CAAP facilities producing less than 100,000 pounds per year is located in Section 8.4.1

Table 6-4 summarizes the pre-tax annualized compliance costs associated with the proposed options based on the screener survey facility counts. The data are divided in terms of commercial and non-commercial groups and annual production category. (Non-commercial facilities include Federal and state hatcheries, Tribal facilities, and academic/research facilities). EPA did not identify any non-commercial facilities with more than 100,000 pounds of annual production in the recirculating and net pen system subcategories. EPA estimates that the total pre-tax annualized compliance costs attributed to the proposed rule are \$1.1 million for the facilities in the screener survey data.

Table 6-4

Estimated Pre-Tax Annualized Cost for Proposed Options (Screener Survey Facility Counts)

Subcategory	Owner	Number of Regulated CAAPs	Pre-tax Annualized Cost (Millions, 2000 dollars)
100,000 - 475,000 Pounds Production			
Flow-through	Commercial	31	\$0.16
Flow-through	Non-Commercial	57	\$0.30
Flow-through	Alaska Non-Profit	15	\$0.32
Recirculating	Commercial	5	\$0.03
Net Pen	Commercial	0	\$0.00
475,000 Pounds Production and Above			
Flow-through	Commercial	9	\$0.04
Flow-through	Non-Commercial	6	\$0.09
Flow-through	Alaska Non-Profit	2	\$0.11
Recirculating	Commercial	3	\$0.02
Net Pen	Commercial	8	\$0.03
Total		136	\$1.10

Note: Count for Flow-through Non-commercial includes one Alaska state-owned facility.

In order to estimate the **national** pre-tax annualized compliance costs attributed to the proposed rule, EPA multiplied the commercial facilities by a factor of 2.5 (see Section 5.4 and Tetra Tech, 2002). These results are presented in Table 6-5. EPA believes it was able to identify all public facilities in its screener survey mailing list, so these compliance costs did not need to be adjusted. EPA estimates that the total pre-tax annualized compliance costs attributed to the proposed rule are **\$1.5 million** for the industry. More than half of the estimated cost (\$0.82 million) is projected to be borne by non-commercial and non-profit facilities. Among commercial facilities, those with flow-through systems will incur the greatest share of the cost (\$0.49 million annually).

**Table 6-5
Estimated Pre-Tax Annualized Cost for Proposed Options**

Subcategory	Owner	Number of Regulated CAAPs	Pre-tax Annualized Cost (Millions, 2000 dollars)
100,000 - 475,000 Pounds Production			
Flow-through	Commercial	78	\$0.40
Flow-through	Non-Commercial	57	\$0.30
Flow-through	Alaska Non-Profit	15	\$0.32
Recirculating	Commercial	13	\$0.06
Net Pen	Commercial	0	NA
475,000 Pounds Production and Above			
Flow-through	Commercial	23	\$0.09
Flow-through	Non-Commercial	6	\$0.09
Flow-through	Alaska Non-Profit	2	\$0.11
Recirculating	Commercial	8	\$0.05
Net Pen	Commercial	20	\$0.09
Total		222	\$1.51

Note: Count for Flow-through Non-commercial includes one Alaska state-owned facility.

6.4 COST-REASONABLENESS

EPA compared the removals of the higher of BOD or TSS with the cost of the proposed BPT option for each subcategory. Cost-reasonableness is calculated on the basis of the screener survey facility counts. The results are summarized in Table 6-6 where the \$/lb ranges from \$0.04/lb for net pen systems to \$0.39/lb for flow-through systems producing between 100,000 to 475,000 pounds per year. The industry average for all four regulated subcategories is \$0.18/lb.

**Table 6-6
Cost-reasonableness of Proposed BPT Options**

Subcategory	Annual Production Level (lbs)	Number of Facilities	Removals (lbs, BOD or TSS)	Pre-tax Annualized Costs (2000\$)	Cost per Pound Removed (\$/lb)
Flow-through	100,000 to 475,000	103	1,974,210	\$777,688	\$0.39
	>475,000	17	2,476,255	\$226,675	\$0.09
Recirculating		8	638,365	\$45,071	\$0.07
Net Pens		8	868,899	\$34,345	\$0.04
Industry Totals		136	5,957,729	\$1,083,779	\$0.18

Note: Screener survey facility counts. 18 Alaska facilities include one state-owned facility (the rest are non-profit).

EPA also has calculated the cost-effectiveness of the removal of nutrients for the options considered in today's proposal. As a benchmark for comparison, EPA has estimated that the average cost-effectiveness of nutrient removal by POTWs with biological nutrient removal is \$4/lb for nitrogen and \$10/lb for phosphorus. Table 6-7 summarizes the nutrient cost-effectiveness by production system for the proposed options. The removals are given for total nitrogen (TN) and total phosphorus (TP) individually and on a combined basis. On the basis of nutrient removal, the proposed options are within the \$4/lb benchmark for recirculating and net pen systems, but not for flow-through systems. For flow-through systems, nutrient CE exceeds \$10/lb threshold for phosphorus (even looking at the combined TN and TP removals) suggesting that the requirements are not very cost-effective for removing nutrients at flow-through systems.

6.5 REFERENCE

Tetra Tech. 2002. Screener Conversion Factor. Technical memorandum to Marta Jordan, EPA from J. Hochheimer, Tetra Tech, dated July 10, 2002. Tetra Tech, Inc., Fairfax, Virginia. DCN 61505. June.

USDA. 2000. United States Department of Agriculture. National Agricultural Statistics Service. *1998 Census of Aquaculture*. Also cited as 1997 Census of Agriculture. Volume 3, Special Studies, Part 3. AC97-SP-3. February.

**Table 6-7
Nutrient Cost-effectiveness of Proposed Options**

Subcategory	Pre-tax Annualized Costs (2000\$)	Nutrient Removals (lbs)			Cost per Pound Removed (\$/lb)		
		TN	TP	TN + TP	TN	TP	TN + TP
Flow-Through	\$1,004,363	50,273	15,830	66,103	\$19.98	\$63.45	\$15.19
Recirculating	\$45,071	25,090	7,363	32,453	\$1.80	\$6.12	\$1.39
Net Pens	\$34,345	74,477	12,413	86,890	\$0.46	\$2.77	\$0.40
Industry Totals	\$1,083,779	149,840	35,606	185,446	\$7.23	\$30.44	\$5.84

Note: 18 Alaska facilities include one state-owned facility (the rest are non-profit).