

of consignees to several million dollars, depending on the nature of the hazard, the type of seafood, the cost and amount of product involved, and the distribution chain of the product. The costs of a recall include searching for the recalled products, removing them from retail and wholesale outlets, replacing the adulterated product, effectiveness checks, and disposal or reconditioning. In some cases recalls cause marketing disruptions, loss of shelf space, and subsequent losses in sales via publicity.

FDA costs include investigative and analytical time and expenses, administrative costs, cost of samples, and auditing time.

FDA assumes that the costs of recalls borne by firms are directly related to the distribution costs associated with the products and to the size of the contaminated lots. Distribution costs account for about one-third of the final value of seafood. FDA assumes that the firm must bear the full amount of the distribution costs of the recall. In addition, the other costs listed above raise the total cost of recalls borne by firms to one-half the value of the product. FDA uses one-half the value of the product as the base for the estimate of total recall costs. The total recall cost of seafood processing firms in 1994 is estimated to be \$2,461,906, as shown in

table 16. FDA audit checks for seafood took 474 hours in 1994. FDA assumes that total FDA costs per recall were proportional to audit hours. The cost per hour of an audit check is \$107, giving an FDA audit cost of \$50,718 (474 x 107). FDA collected 72 samples at \$250 per sample, giving sample costs of \$18,000 (72 x 250). FDA thus estimates additional costs due to recalls to be \$68,718 (\$50,718 + \$18,000). The total recall cost is estimated to be \$2,530,624 (\$2,461,906 + \$68,718). Again, the estimate for the purpose of this benefits analysis assumes that half of all recalls will be prevented or about \$1,250,000.

TABLE 16.—RECALLS IN 1994

| Fish | Hazards | Amount | Total |
|--|--|--------------------------|--------------|
| Canned tuna | Filth, decomposed, punctured cans, short weight. | 6,599 cases | \$150,687 |
| Crab | <i>L. monocytogenes</i> | 16,156 lbs | 64,624 |
| Escolar fish | Decomposed, sc ombroid, illness | 1,719 lbs | 1,614 |
| Herring, salted Schmalz | <i>L. monocytogenes</i> | 1,200 lbs | 1,740 |
| Hilsha fish | <i>Salmonella</i> | 2,000 lbs | 2,100 |
| Lobster | <i>L. monocytogenes</i> , salmonella | 25,920 lbs | 243,648 |
| Mahi mahi, fresh | Decomposed | 575 lbs | 834 |
| Nova chips | <i>L. monocytogenes</i> | 54 lbs | 157 |
| Oysters, shellstock | <i>V. vulnificus</i> | 9,219,430 lbs | 1,843,886 |
| Oysters, shucked | <i>V. vulnificus</i> | 21,944 lbs | 87,776 |
| Sardines, flat fillets | Rusty, leaky, decomposed | 33,600, 13 oz cans | 50,400 |
| Smoked catfish, salmon, sturgeon, tuna | <i>L. monocytogenes</i> | 1,060 lbs | 2,963 |
| Tuna steaks | Decomposed | 7,110 lbs | 11,477 |
| Total | | | 2,461,906.00 |

e. *Injunctions.* Injunctions are the most severe form of domestic penalties whereby a firm is enjoined from producing/distributing a product until a violation is remedied. There are approximately 5 injunctions by FDA against seafood products each year costing the firm an average of about \$70,000 and FDA an average of about \$30,000 each or about \$500,000 per year. These costs include court costs, analytical testing costs, inspections costs, and lost production costs. Again, if this rule reduced injunctions by half, societal savings would be \$250,000.

Total enforcement benefits are the sum of all of the reduced enforcement costs estimated to be approximately \$20 million per year.

7. Other Benefits

Commenters also mentioned benefits including better process control (resulting in lower production costs) and improved employee morale.

FDA believes that there may be "re-engineering" types of benefits associated with these regulations. For both seafood and other foods for which

HACCP has been implemented, FDA has received information that firms have found cost-saving innovations in other areas as they implement HACCP. These innovations are considered trade secrets by firms and thus, their description (actual process innovations) and quantification is impossible as firms have not released this data into the public domain. This phenomenon involves unexpected savings and efficiencies as a result of establishing a new system in a processing operation. The majority of firms that have previously instituted HACCP reported that they believed that the advantages they derived from HACCP were worth the costs to them in terms of better control over their operations, better sanitation, and greater efficiencies, such as reduced waste. Virtually all foresaw long-term benefits from operating under HACCP.

Improved employee morale depends on how HACCP is implemented. If, for example, employees are (1) participating in day-to-day monitoring of critical control points, (2) allowed through corrective action plans to participate in

corrective actions including shutting down a line when a critical limit has been exceeded, and (3) are rewarded for this decision rather than penalized or forced to rigorously defend their actions, then employee morale may increase. Such an increase in morale, if valid, may lead to greater productivity. However, it is in the direct financial interest of every company to maintain employee morale such that any additional benefit from this regulation is likely to be small.

A final benefit will be realized for finfish where processing plants and vessels, in an effort to control for histamine formation, keep fish cooled from harvest to retail. This will simultaneously decrease the decomposition rate that causes seafood to be thrown out because of organoleptic problems. The same situation exists relative to cooked, ready-to-eat products and smoked fish. One retailer cited losses of 4 percent to 8 percent of all seafood because of decomposition. If some of this decomposition begins prior to arrival at the retail level and is reduced in any degree by this