the extent of the problem, and the degree of regulatory control required to safeguard the wholesomeness of the food supply and to correct the problem. The selective program has been used to control specific PCB incidents.

V. SOURCES OF CONTAMINATION

Because of their widespread industrial applications, their chemical stability and persistence, and their ubiquitous presence in the ecosystem, it is not unexpected that PCB residues have been detected in a variety of food commodities. Several sources of contamination have been identified. These can be generally divided into three categories:

1. Environmental contamination - background levels of PCBs in fish from contaminated lakes and streams.
2. Industrial accidents - isolated incidents involving direct leakage and spillage or contact of PCB fluids and other PCB containing materials on animal feeds, feed ingredients or food.
3. Food packaging materials - PCB migration to foods packaged in PCB contaminated paper products. Identification of these categories is not intended to imply that all positive PCB findings in food and other materials have been successfully traced to any one of the three sources. Samples have been reported where the cause of the PCB residue was not clearly defined, and one could only speculate as to the source of the residue.

Since examination for PCB residues was incorporated into the routine sampling programs of FDA and USDA, thousands of objective samples have been analyzed. Additionally, numerous investigative surveys and selective samplings have been conducted to respond to specific "accidents" and other problems associated with PCBs in food.

VI. RESULTS OF SURVEILLANCE SAMPLING PROGRAMS

Since November 1969, FDA has analyzed for PCB residues all raw agricultural commodities and other food classes sampled under its pesticide surveillance program. More than 15,000 sample examinations had been completed as of June 1971. A total of 279 of the objective samples was reported to contain PCBs (Table 1). An additional 200 food samples, collected as follow-up samples of suspected lots because previous analyses indicated a potential problem, were also found to contain PCB residues (Table 2).

PCBs were encountered most frequently in fish, with 317 of the total positive samples (479). The levels in fish reported in Tables 1 and 2 indicates that most residues are between 1 and 10 parts per million. The Department of the Interior and others have gathered extensive amounts of data on PCB residues in fish, and it appears that the occurrence of PCB residues in fresh water fish is widespread geographically. Residue levels are related to location (highest in waters near industrial and metropolitan centers) and the species of fish (high or low fat, and feeding habits). In order to control the interstate shipment of fish containing excessive residues of PCBs, FDA (February 1970) established

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TABLE 1

POSITIVE ANALYSES OF RANDOM FOOD SAMPLES
November 1969 through June 1971
(15,000 Samples Analyzed --all prior to East Coast Terminal Fish Meal Incident)
Number Positive Samples (Range-ppm) Average ppm

Examining District	Fish	Fish By Product	Cheese[a]	Milk[a]	Shell Eggs	Potato By Product	Oysters	Misc.	Total Positive All Products
Los Angeles	23(0.1-2.60).62	5(0.2-5.0)2.10		6(0.15-0.30).19	1(0.03).03				35
Minneapolis	2(.12-35.29)17.70								2
New Orleans	23(T-1.70)0.4[d]							Milled Rice 1(0.20)	24
New York	3(0.21-4.78)2.49								3
San Francisco					1(0.50).50				1
Seattle	1(0.40).40					8(0.10-4.20)1.16		Straw 1(0.30) Wheat 1(0.32)	11
Kansas City	19(0.60-13.30)3.41								19
Atlanta	1(0.53).53[e]		1(T)	2(0.94-0.97).96				Silage 1(0.82) Silo Coating 1(11.3)	6
Baltimore				22(T-12.58)2.69	5(T-T).00		12(T-T).00	Crabmeat 1(0.24)	40
Boston	1(6.08)6.08								1
Buffalo	19(T-13.00)3.26[d]	1(T).00							20
Chicago				1(0.23)0.23					1
Cincinnati	55(0.04-4.70)1.77			4(0.22-0.24).24					59
Denver						2(0.15-1.12).64			2
Detroit	49(0.25-15.5)2.96			4(0.49-1.86)1.27				Cat Food 1(6.49) Duck 1(0.70)	55
Dallas									0
Total Positive	196	6	1	39	7	10	12	8	279

[a]ppm fat basis [d]T=Trace; not incl. in ave. [e]marine species

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TABLE 2

POSITIVE FOLLOW-UP INVESTIGATIONAL SAMPLES
collected because of suspected PCB Residues
November 1969 through June 1971
Number Positive Samples (Range-ppm) Average-ppm

Examining District	Fish	Fish By Product	Cheese[a]	Milk[a]	Shell Eggs	Potato By Product	Oysters	Misc.	Total Positive All Products
Los Angeles	31(0.1-6.0)1.54		43 (.03-1.0).30[c]						74
Minneapolis	58(T-9.37)1.97[d]								58
New Orleans	4(0.26-2.0)1.03							Boiled Oyster 1(0.23)	5
New York								Frog Legs 1(0.09)	1
San Francisco									0
Seattle	1(1.98)1.98					2(1.39-1.73)1.56			3
Kansas City	1(8.39)8.39								1
Atlanta	2(0.43-1.23).83[e]			2(6.60-22.80)14.7					4
Baltimore	5(T-T).00			13(0.57-9.96)4.03	10(T-.01).01			Apple Pomace 1(T)	29
Boston									0
Buffalo	3(1.51-2.29)1.95								3
Chicago				6(0.14-0.24).19					6
Cincinnati	3(1.00-1.50)1.27								3
Denver	3(0.32-0.77).54[e]								3
Detroit	10(0.73-4.70)2.47								10
Dallas									0
Total Positive	121	0	43	21	10	2	0	3	200

[a] ppm fat basis [c] import [d] trace; not incl. in ave. [e] marine species

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an interim action level of 5 parts per million in the edible portion of the fish.

The surveillance data for milk and manufactured dairy products also shows this class of food to have a relatively significant incidence of positive findings. For the most part, the PCB sources were traceable to localized "industrial accidents" which are described elsewhere in this report and were not always present as environmental contaminants. The occurrence of PCBs in milk does not appear to be widespread nationally.

Although no PCBs were found in fresh fruits or vegetables, residues were reported in potato by-products used for animal feed. The source of contamination in this case has not been established.

The FDA total diet studies for Fiscal Years 1970, 1971, and 1972 (first-half only) included PCB analysis for 75 market baskets representing 900 composite samples. These analyses showed 54 composite samples to contain PCB residues ranging from a trace to 0.36 parts per million (Table 3). Twenty-six of the positive samples were present in the meat, fish, and poultry composite, and nineteen in the grain and cereal composite. Findings in other food class composites were at less than 0.05 parts per million, with no consistent pattern of PCB occurrence. These studies indicate the dietary intake of PCBs is of a low order. Expressed as mg/kg body weight/day, the PCB level for FY 70 was less than 0.0001 and 0.0001 in FY 71 and FY 72.

The objective phase of the USDA sampling program for meat and poultry during 1971 detected PCBs in 164 of the 4,175 samples analysed. There were 25 samples positive in the 2,404 samples collected from cattle, swine, calves, and sheep with a range in the positive results from .1 parts per million to 3.0 parts per million. The poultry samples reflected the contaminated feed supply in the Southeastern United States and in the 1,804 samples analysed, there were 140 positive with an analytical range of 1 parts per million to over 15 parts per million. The three poultry classes, young chickens, fowl, and turkeys, all had between 7 - 9 percent samples positive for PCBs with a range of 1 parts per million. Only two samples were over guidelines established by FDA.

VII. INDUSTRIAL ACCIDENTS

The following isolated incidents of avoidable PCB contamination of food led to the actions described to remove the contaminated food from the market.

A. POULTRY

1. New York State Incident. The Campbell Soup Company, Camden, New Jersey, noted in December 1970 surveillance data excessive PCB residues in chickens grown in New York State. The State of New York placed a quarantine on the three counties involved and pretesting of all fowl was mandatory before slaughter.

Analysis indicated PCBs in poultry fat varying from a non-detectable level to 26.8 parts per million. FDA advised the State of New York and USDA on February 1, 1971, that FDA would not object to the

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