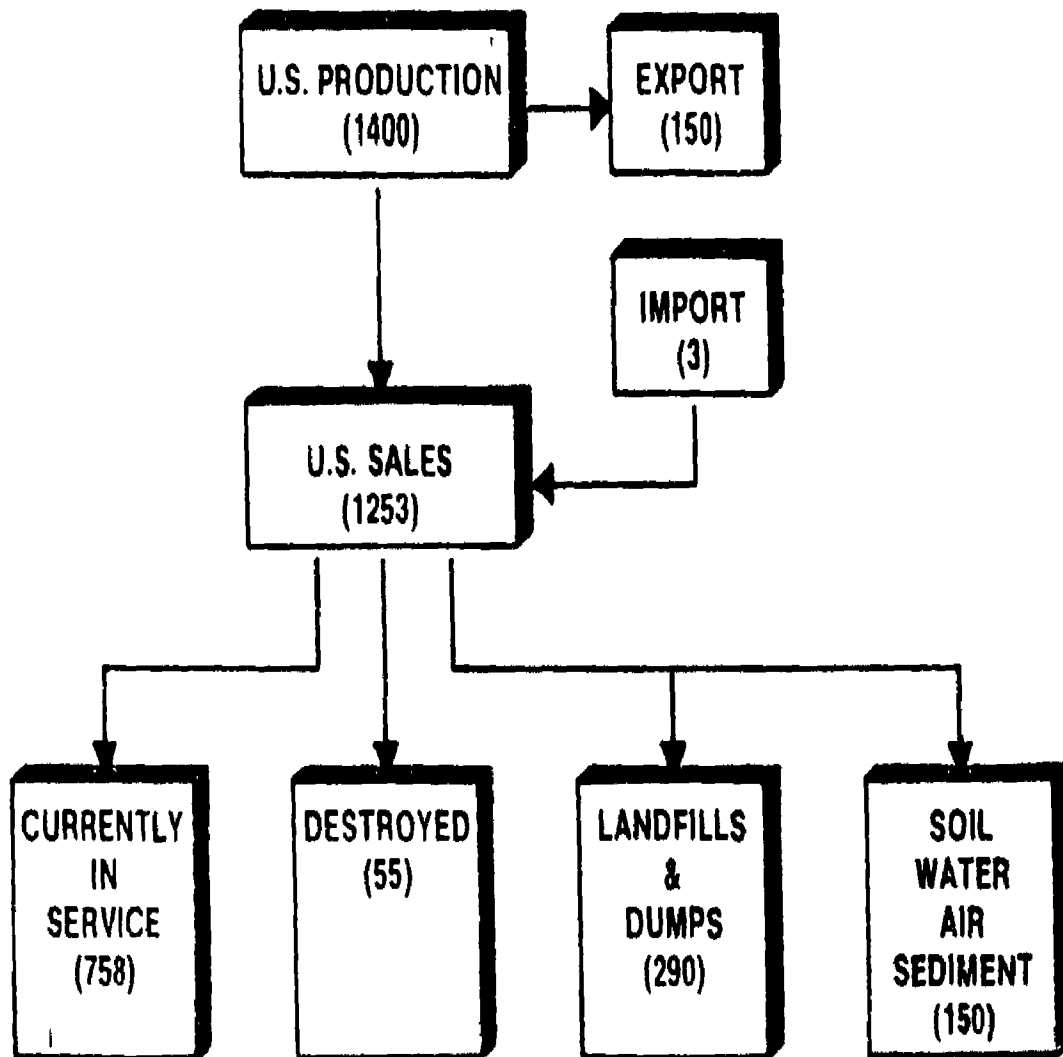


PCB PRODUCTION

1930 — 1975
(MILLIONS OF POUNDS)



MONS 207501

USES OF PCB

CURRENT

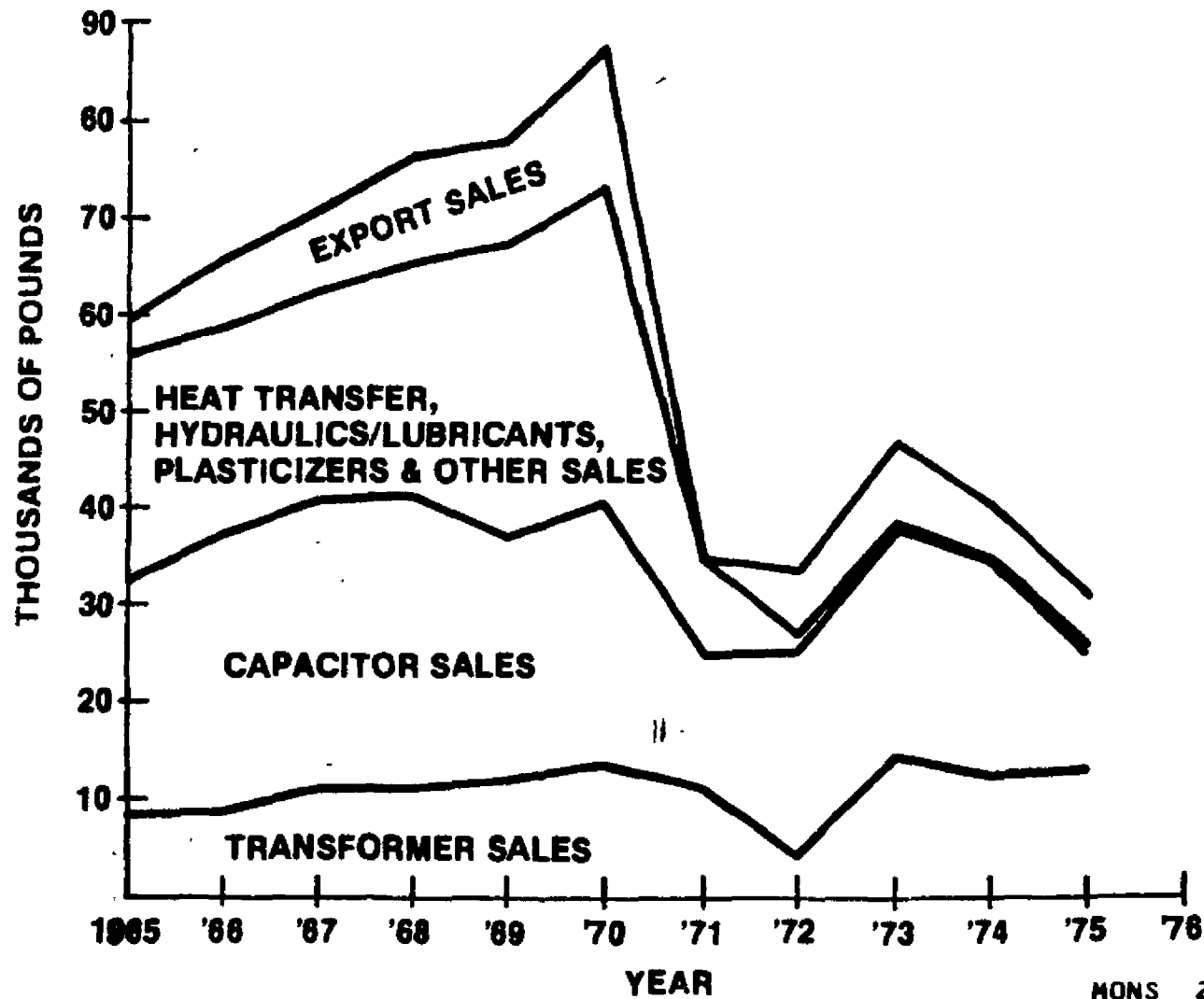
- **ELECTRICAL TRANSFORMER (LARGE)**
- **ELECTRICAL CAPACITOR (LARGE & SMALL)**
- **RECYCLED PAPER (CONTAMINANT)**
- **INVESTMENT CASTING (IMPORT)**

DISCONTINUED

- **HEAT TRANSFER FLUID**
- **HYDRAULIC FLUID**
- **LUBRICANT & CUTTING OIL**
- **PLASTICIZER**
- **ADHESIVE**
- **WAX EXTENDER**
- **PESTICIDE EXTENDER**
- **INK**
- **SEALANT & CAULKING COMPOUND**
- **PAPER COATING**

MONS 207502

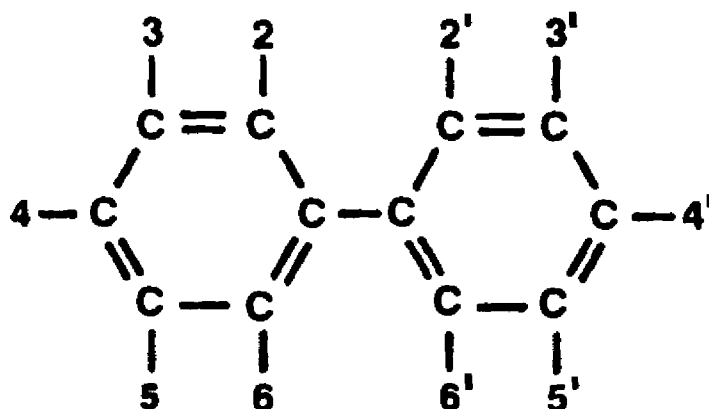
PCB SALES



MONS 207503

PCB — CHEMISTRY

POLYCHLORINATED BIPHENYL



CHLORINATION FROM $O(C_{12}H_{10}) \longrightarrow 10(C_{12}Cl_{10})$

TOXICITY — VARIES BY NUMBER & POSITION OF CHLORINES

PERSISTENCE — 4 CHLORINES & UP

DECOMPOSITION PRODUCTS

DIBENZOFURAN

HYDROXYLATED CHLORINATED BIPHENYL

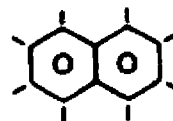
DESIRED PROPERTIES — DIELECTRIC CONSTANT

NON-FLAMMABILITY

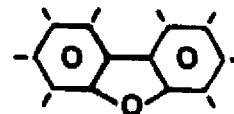
THERMAL CONDUCTIVITY

COMPOUNDS

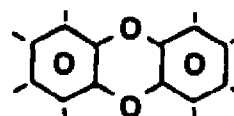
CHLORINATED NAPHTHALENES



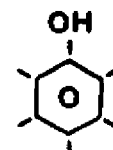
CHLORINATED DIBENZOFURANS



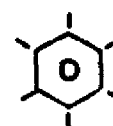
CHLORINATED DIBENZO-p-DIOXINS



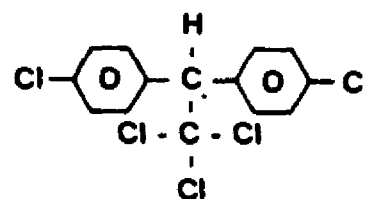
CHLORINATED PHENOLS



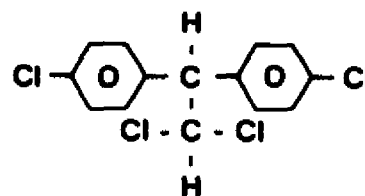
CHLORINATED BENZENES



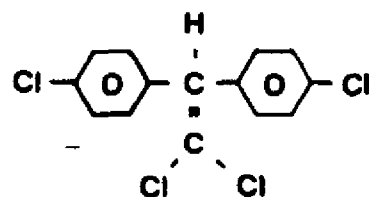
DDT



DDD



DDE



SIGNIFICANT EVENTS—PCB

- 1930 — BEGAN PRODUCTION**
- 1936 — FIRST OCCUPATIONAL EXPOSURE SYMPTOMS**
- 1966 — FOUND IN ENVIRONMENT (SWEDISH DDT WORK)**
- 1968 — JAPANESE RICE OIL CONTAMINATION**
- 1970 — USDA BANS IN PESTICIDES**
- 1971 — FEDERAL TASK FORCE & CONFERENCE**
 - MONSANTO RESTRICTS SALES**
- 1972 — MICH. & WISC. WARNING ON LAKE MICHIGAN FISH**
 - GSA BANS USE IN PAPER**
 - ANSI PUBLISHES HANDLING & DISPOSAL PROCEDURE**
 - USDI BANS USE IN OFFSHORE OIL DRILLING**
- 1973 — FDA TEMPORARY TOLERANCES & RESTRICTIONS**
 - OECD DECISION TO SUPPORT CONTROL**
- 1975 — 2nd NATIONAL CONFERENCE**
 - FISH BAN IN MINN.**
 - EPA ADMINISTRATOR CALLS FOR ELIMINATION FROM COMMERCE**
 - EPA PROPOSES SPILL REGULATIONS**
- 1976 — FISH BANS IN S.C., N.Y., GA., IND.**
 - NY WARNING ON LAKE ONTARIO FISH**
 - MICH., IND., WISC. PASS RESTRICTION LAWS**
 - EPA PROPOSES TOXIC EFFLUENT STANDARD (WATER)**
 - EPA PUBLISHES DISPOSAL GUIDANCE**
 - PROPOSED TSCA BANS FROM COMMERCE IN 2½ YEARS**

PCB AMBIENT AIR LEVELS

24 HOUR SAMPLES

MIAMI, FLA.

JACKSONVILLE, FLA.

FORT COLLINS, COL.

AVERAGE FOR EACH = 100 nanograms/cm

MONS 207507

PCB AMBIENT WATER LEVELS

1971-1974

— 4472 WATER SAMPLES

130: RANGE — .1 → 4.0 ppb

DETECTION LIMIT — .1 → 1. ppb

— 1544 SEDIMENT SAMPLES

1157: RANGE — .1 → 13,000 ppb

DETECTION LIMIT — .1 → 1. ppb

1973 — 106 INTERSTATE WATER CARRIERS

WINNEBAGO, ILL. — 3 ppb

SELLERBURG, IND. — .1 ppb

1975 — INDUSTRY REPORT

ESCONDIDO, CAL. — .4 ppb

BRIDGEPORT, CONN. — 1. ppb

NEW BEDFORD, MASS. — 2.5 ppb

1976 — 113 WATER SUPPLY SAMPLES

1 PRELIMINARY — 1 ppb

PCB SOIL LEVELS

AGRICULTURAL

1972

- **1,556 SAMPLES**
- **2 DETECTED**

URBAN

1971-1974

- **12 OF 19 METROPOLITAN AREAS**
 - • **1,434 SAMPLES**
 - • **RANGE — .001 —→ 3.33 ppm**
 - • **AVERAGE — .02 ppm**

PCB SEWAGE TREATMENT PLANTS

1973 — MICHIGAN — 58 PLANTS

SLUDGE

- **AVG. 15.6 ppm**
- **HIGH 352 ppm**

EFFLUENTS

- **AVG. 0.52 ppb**
- **HIGH 32 ppb**

1972-73 ONTARIO, CANADA

GUELPH

- **SLUDGE — 5.5 ppm**
- **SOIL — 15-47 ppb (1 APPLICATION)**
- **CORN — 5-95 ppb**

1976

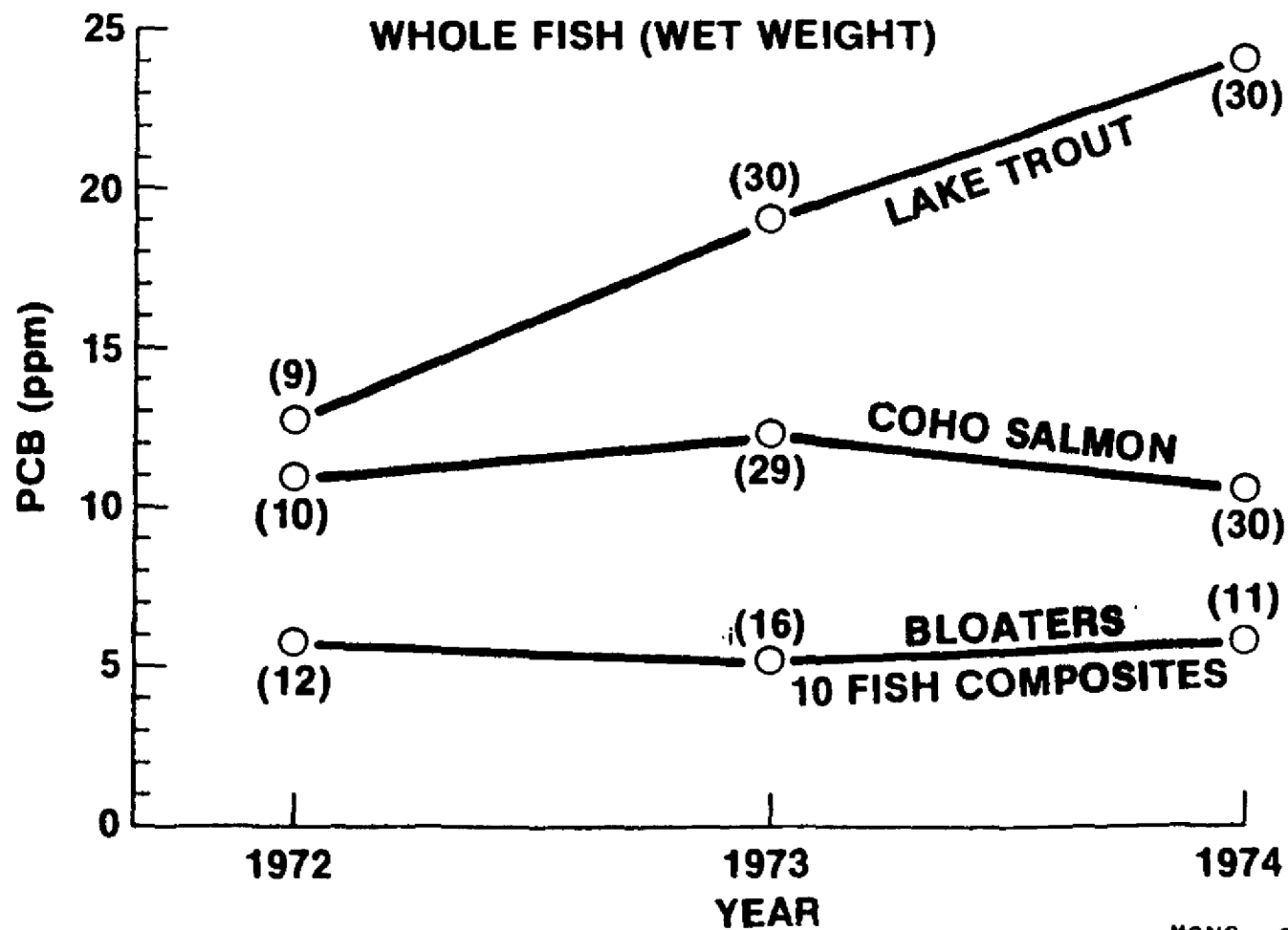
BLOOMINGTON, INDIANA — 200 ppm
NEW BEDFORD, MASS. — 40 ppm
WASHINGTON, D.C. — 4 ppm

PCB—MUNICIPAL LANDFILLS (1976)

STATE	TYPE	PPT
WASHINGTON	GENERAL	15 — LEACHATE
NEBRASKA	GENERAL GENERAL GENERAL SLUDGE & MANURE	41 — LEACHATE WELLS 8 — SURFACE (CREEK) 11 — GROUND WATER 115 — LEACHATE
NEW YORK	GENERAL & SLUDGE GENERAL & SLUDGE	640 — LEACHATE 7 — GROUNDWATER
ARKANSAS	SLUDGE SLUDGE SLUDGE	15 — LEACHATE 17 — SURFACE 8 — GROUNDWATER

PCB—FISH LEVELS

LAKE MICHIGAN



PCB—BIRDS

STARLING MONITORING PROGRAM

**NATIONWIDE 1970 — 0.65 ppm
1972 — 0.43 ppm
1974 — 0.12 ppm**

MALLARD AND BLACK DUCK MONITORING PROGRAM

ATLANTIC FLYWAY

- **BLACK DUCK — 1969 & 1972 — 1.36 ppm**
- **MALLARD — 1969 & 1972 — 1.29 ppm**

MISSISSIPPI FLYWAY

- **MALLARD — 1969 — 0.44 ppm**
- **MALLARD — 1972 — 0.66 ppm**

CENTRAL & PACIFIC FLYWAYS

- **MALLARD — 1969 — 0.2 ppm**
- **MALLARD — 1972 — 0.1 ppm**

MONS 207513

LEVELS IN MAN

RECENT ANALYSIS — 1971-74 ADIPOSE LEVELS

— 6500 SAMPLES — 77% WITH PCB

— — 26% — <1 PPM

— — 44% — 1-2 PPM

— — 7% — >2 PPM

OTHER FINDINGS:

— — SEX DIFFERENCE — NONE

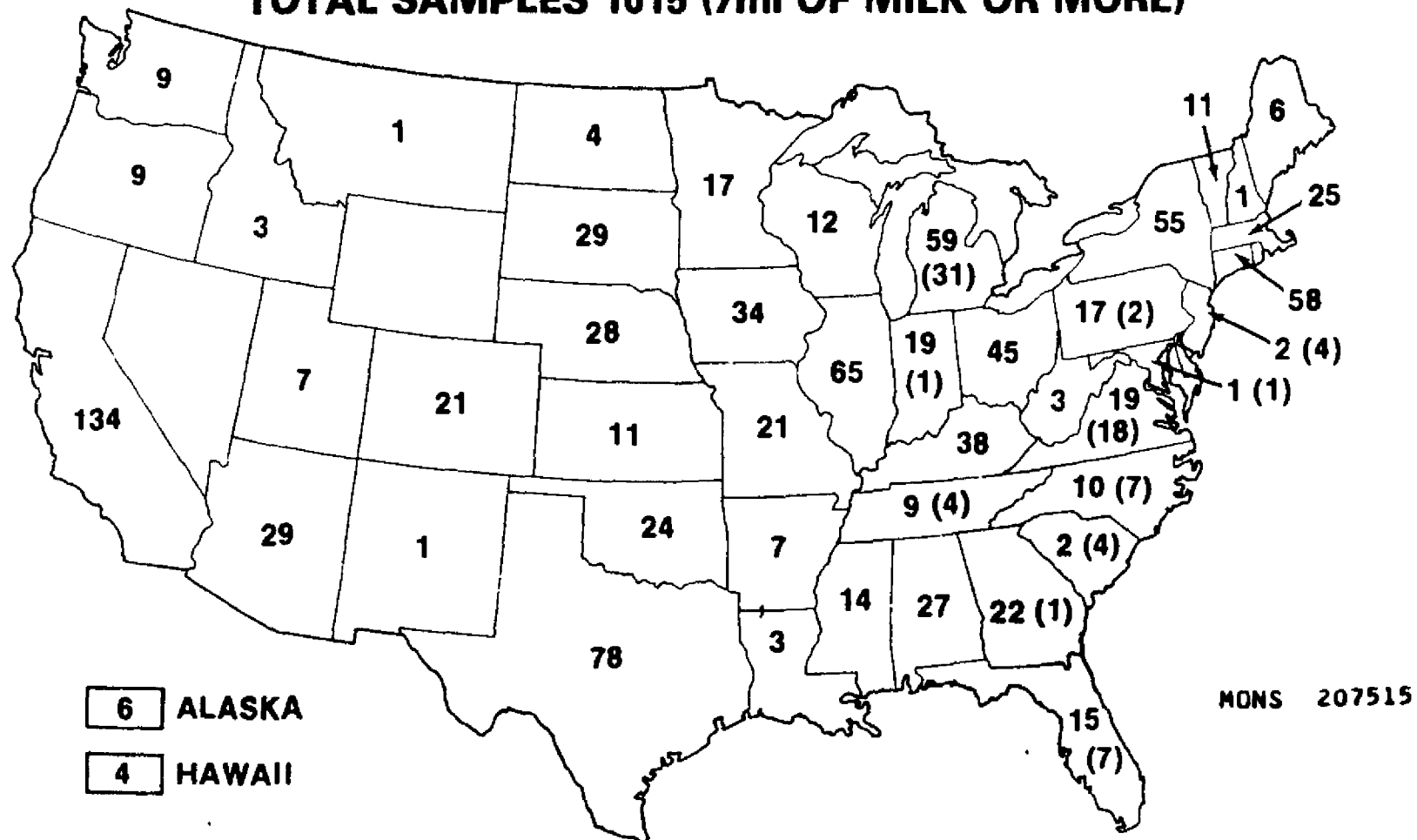
— — AGE DIFFERENCE — INCREASE W AGE

— — RACE DIFFERENCE — NONWHITES HIGHER

MOTHERS' MILK SAMPLE PLAN

COLORADO STATE UNIVERSITY

TOTAL SAMPLES 1015 (7ml OF MILK OR MORE)



6 ALASKA

4 HAWAII

MONS 207515

() INDICATES SAMPLES ALREADY ANALYZED

PCB IN MOTHERS' MILK

COLORADO STATE UNIVERSITY DATA

9/76

STATE	NO. SAMPLES	RANGE (PPM)	MEAN (PPM)
VIRGINIA	18	0- 3.90	1.42
NORTH CAROLINA	7	1.24- 4.44	2.64
FLORIDA	7	.22- 4.13	1.79
TENNESSEE	4	.70- 2.38	1.75
SOUTH CAROLINA	4	.25- 4.01	1.96
NEW JERSEY	4	.43- 2.88	1.72
PENNSYLVANIA	2	1.08- 1.50	1.29
GEORGIA	1	.53	—
MARYLAND	1	2.52	—
MICHIGAN	31	.41-10.60	1.88
INDIANA	1	1.92	—
TOTAL	80	0-10,599	1.80

DDE IN MOTHERS' MILK

COLORADO STATE UNIVERSITY DATA

8/76

STATE	NO. SAMPLES	RANGE (PPM)	MEAN (PPM)
VIRGINIA	18	.38-5.15	2.43
NORTH CAROLINA	7	.89-4.32	2.72
FLORIDA	7	1.61-6.43	2.96
TENNESSEE	4	2.04-2.64	2.33
SOUTH CAROLINA	4	1.30-3.42	2.40
NEW JERSEY	4	1.71-2.65	2.01
PENNSYLVANIA	2	4.25-5.60	4.92
GEORGIA	1	2.75	—
MARYLAND	1	1.79	—
MICHIGAN	31	.31-5.81	1.82
INDIANA	1	3.20	—
TOTAL	80	.31-6.43	2.31

MONS 207517

PCB IN MOTHERS' MILK

PREVIOUS DATA

1969 CALIFORNIA	WHOLE MILK	60 ppb MEAN [2.4 ppm FAT]	
1970 SWEDEN	WHOLE MILK	16 ppb MEAN [.64 ppm FAT]	
1971 GERMANY	FAT	3.5 ppm MEAN	
NEW GUINEA } TEXAS }	—	NONE DETECTED	
1972 COLORADO	WHOLE MILK	.04—.10 ppm	39 SAMPLES (8 POSITIVE)
1973-74 ARKANSAS & MISSISSIPPI	WHOLE MILK	TRACE AMOUNTS (<1 ppm)	57 SAMPLES
ONTARIO: 1969-70 1971-72 1973-74	FAT	RANGE MEAN ppm ppm .7-1.2 1.0 .2-3.0 1.2 .1-2.5 1.2	43 SAMPLES 34 SAMPLES 19 SAMPLES
1974 NEW BRUNSWICK NOVA SCOTIA	FAT	ppm MEAN 1.07-2.1 1.5 0-2.4 1.8	6 SAMPLES 9 SAMPLES
1975 JAPAN	WHOLE MILK	ppm /ppm FAT .027 avg. [1.0] 0.1 max. [4.0]	281 SAMPLES (.033 ppm WHOLE TOLERANCE)