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**BRIEF SUMMARIES FROM THE BOOK:
"GUAM, THE LAND OF THE ROSARIES":
STUDY OF THE CONTAMINATION OF GUAM'S WATER,
SOIL, AIR, AND FOOD
WITH TOXIC CHEMICALS KNOWN TO REPRESENT A
SERIOUS HEALTH
RISK TO THE HUMAN POPULATION, ANIMALS, AND
PLANTS.**

by

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**Chapter 84: Polychlorinated Biphenyls (PCBs)
Federal Agency for Toxic Substances & Disease Registry
(ATSDR)**

PCBs: sites, dates, and concentrations/comparison values (CVs).

Shallow Subsurface Soil:

- GUAM, YIGO**–(SITE NO. 34)= " **PCB Storage Area** " - Operable Unit. Main Base.

Dates of operation are unknown.

PCBs: concentrations "above" CVs ----
up to 19 ppm

EXPOSURE

- 1. PCBs are a group of synthetic organic chemicals that can cause a number of different harmful effects. There are no known natural sources of PCBs in the environment, they are either oily liquids or solids. Some PCBs are volatile and may exist as a vapor in air.**
- 2. PCBs may enter the air, water, and soil from wastes placed in landfills, or from poorly maintained hazardous waste sites. Once in the environment, PCBs do not readily break down and therefore may remain for very long periods of time. They can easily cycle between air, water, and soil. For example, PCBs can**

enter the air by evaporation from both soil and water.

- 3. In air, PCBs can be carried long distances and have been found in seawater far away, from where they were released. They will eventually return to land and water by settling as dust or in rain.**
- 4. In water, PCBs may be transported by currents, attach to bottom sediment or particles in the water, and evaporate into air.**
- 5. Sediments that contain PCBs can also release the PCBs into the surrounding water. They do not readily break down in soil and may stay in the soil for years. Evaporation appears to be an important way by which the PCBs leave soil.**
- 6. As a gas, PCBs can accumulate in the leaves and aboveground parts of plants and food crops.**
- 7. PCBs are taken up into the bodies of small organisms and fish in water. They are also taken up by other animals that eat these aquatic animals as food. PCBs especially accumulate in fish and marine mammals, reaching levels that may be many thousands of times higher than in water.**
- 8. If people breathe air that contains PCBs, they can enter the body through the lungs and pass into the bloodstream.**

- 9. PCBs can also enter the body by eating meat or fish products or other foods**
- 10. PCBs remain in the body and are stored for years mainly in the fat .**
- 11. PCBs collect in milk fat and can enter the bodies of infants through breast-feeding.**

HEALTH EFFECTS

Many studies have looked at how PCBs can affect human health. Most of the studies of health effects of PCBs in the general population examined children of mothers who were exposed to PCBs

- Health effects from exposures from conception to maturity at 18 years of age:**
 - Children are exposed to PCBs both prenatally and from breast milk. PCBs are stored in the mother's body and can be released during pregnancy, cross the placenta, and enter fetal tissues. Because PCBs dissolve readily in fat, they can accumulate in breast milk fat and be transferred to babies and young children. PCBs have been measured in umbilical cord blood and in breast milk.**
 - Children are exposed to PCBs in the same way, as are adults, by eating contaminated food, and drinking contaminated water.**

- **Because the brain, nervous system, immune system, thyroid, and reproductive organs are still developing in the fetus and child, the effects of PCBs on these target systems may be more profound after exposure during the prenatal and neonatal periods, making fetuses and children more susceptible to PCBs than adults.**

1. Low Weight Babies:

Studies of women who consumed high amounts of fish contaminated with PCBs had babies that weighed less than babies from women who did not eat fish.

2. Abnormal Infant Behavior:

Studies of babies born to women who ate fish contaminated with PCBs before and during pregnancy showed abnormal responses to tests of infant behavior. Some of these behaviors, such as problems with motor skills and a decrease in short-term memory, persisted for several years.

3. Immunological Defects in Children:

Studies suggest that the immune system may be affected in children born to and nursed by mothers exposed to increased levels of PCBs.

□ Cancer

Studies of workers provide evidence that PCBs were associated with certain types of cancer in humans, such

as cancer of the liver and biliary tract. The Department of Health and Human Services (DHHS) has stated that PCBs may reasonably be anticipated to be carcinogens. Both EPA and the International Agency for Research on Cancer (IARC) have determined that PCBs are probably carcinogenic to humans.

Regulations of the Federal Government to protect human Health:

- **EPA:**

For the protection of human health from the possible effects of drinking the water or eating the fish or shellfish from lakes and streams that are contaminated with PCBs, the EPA regulates that the level of PCBs in these waters be no greater than 0.17 parts of PCBs per trillion parts (ppt) of water. The EPA requires that companies that transport, store, or dispose of PCBs follow the rules and regulations of the federal hazardous waste management program. EPA also limits the amount of PCBs put into publicly owned wastewater treatment plants.

- **FDA:**

Has set residue limits for PCBs in various foods to protect from harmful health effects. FDA required limits include 0.2 parts of PCBs per million parts (ppm) in infant and junior foods, 0.3 ppm in eggs, 1.5 ppm in milk and other dairy products (fat basis), 2 ppm in fish and shellfish (edible portions), and 3 ppm in poultry and red meat (fat basis).

