

SAMPLING RESULTS FOR PESTICIDES FROM BUILDINGS IN AREA 7

In the past, Buildings IN-1-3, IN-1-4, IN-1-5, and IN-1-6 in Area 7 were used to store pesticides. Some of these pesticides are still detectable in the soil around the building and in the dust inside the buildings.

The following sample types were taken inside each of the buildings:

Wipe Samples. Sampling crews wiped parts of the walls and floor with cloths. In each case, a one-square-foot area was wiped. Each cloth was then analyzed for pesticides. In Building IN-1-6 cardboard boxes stored in the building were also wiped for analysis. The wipe samples were taken to check for the presence of pesticides. There are no health-based standards to compare the results with. Pesticides were detected in all wipe samples, with the highest detections being aldrin and dieldrin in samples from the floors. Results are shown in the attached table.

Dust Samples. In each building, sampling crews swept part of the floor and collected the dust in a sample jar. The dust was analyzed for pesticides. Results are shown in the attached table. As shown, the highest pesticide concentrations were in Building IN-1-5 and the lowest concentrations in Building IN-1-3. Aldrin and dieldrin were detected at the highest concentrations.

Air Samples. The sample crews collected air samples to correspond with each dust sample. The purpose of the air samples was to estimate the amount of dust that workers in the buildings might be exposed to. The air sampler, which is worn by one of the sampling personnel, creates a vacuum which pulls in air in the vicinity of the worker. The air passes over a filter which collects the dust.

The air sampler measures the volume of air that passes through the filter. The filter is weighed in a laboratory before and after sampling to determine the mass of dust in the volume of air that passed through the filter. These data are then used to calculate an average dust concentration during the time of the sampling (average dust concentration = dust mass collected/air volume measured by sampler).

For each building, air was sampled during the approximately 20 minutes it took the sampling crew to sweep up a dust sample, collect it in a

jar, label and seal the jar, and prepare the chain of custody. About 5 minutes of this time was spent sweeping. The intent was to estimate dust levels that a worker might typically be exposed to.

PESTICIDES FOUND IN AREA 7

Aldrin and Dieldrin are chemically similar. Aldrin breaks down to dieldrin in the body and the environment. From 1950-1970, aldrin and dieldrin were popular pesticides for crops like corn and cotton. Because of concerns about damage to the environment and the potential harm to human health, EPA banned all uses of aldrin and dieldrin in 1974 except to control termites. In 1987, EPA banned all uses.

Aldrin and dieldrin mainly affect the central nervous system. Exposure to moderate levels over long periods may cause convulsions. Lesser effects are headaches, dizziness, vomiting, irritability, and uncontrolled muscle movements. Dieldrin has been shown to cause liver cancer in mice, but neither aldrin or dieldrin have been shown to cause cancer in humans. The National Institute for Occupational Safety and Health (NIOSH) considers both aldrin and dieldrin to be carcinogens.

DDT, DDD, and DDE are similar chemicals. DDT was a manufactured chemical widely used to control insects on agricultural crops and insects that carry diseases like malaria and typhus. Because of damage to wildlife and the potential harm to human health, the use of DDT was banned in the United States, except for public health emergencies. DDD and DDE are breakdown products of DDT, and contaminants of manufactured DDT.

DDT affects the central nervous system. It has been shown to be harmful to birds. No effects were seen in people who took small daily doses of DDT by capsule for 18 months. The Department of Health and Human Services (DHHS) has determined that DDT may reasonably be anticipated to be a human carcinogen.

Endrin, Endrin Ketone, and Isodrin are similar chemicals. Endrin was used to control insects, rodents, and birds. Endrin has not been produced or sold for general use in the United States since 1986. When endrin is exposed to light, it breaks down to endrin ketone. Symptoms that may result from endrin poisoning are headaches, dizziness, nervousness, confusion, nausea, vomiting, and convulsions. The EPA has determined that endrin is not classifiable as to its human carcinogenicity because there is not enough information to allow classification.

Information from Centers for Disease Control. For more information see <http://www.atsdr.cdc.gov/toxfaq.html>.

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The measured dust concentrations for each building are as follows:

Building IN-1-3—11.0 mg/cubic meter
Building IN-1-4—3.0 mg/cubic meter
Building IN-1-5—6.7 mg/cubic meter
Building IN-1-6—6.9 mg/cubic meter

If we assume that the dust in the air has the same pesticide concentrations as the dust on the floor, the calculated aldrin concentrations for each building, for the 20-minute dust monitoring periods are:

Building IN-1-3—0.000044 mg/cubic meter
Building IN-1-4—0.00042 mg/cubic meter
Building IN-1-5—0.035 mg/cubic meter
Building IN-1-6—0.00014 mg/cubic meter

The Occupational Safety and Health Administration (OSHA) and the National Institute for Occupational Safety and Health (NIOSH) both have exposure limits for aldrin of 0.25 mg/cubic meter. This is the maximum average acceptable level that a worker should be exposed to for 40 hours per week. As shown, the calculated aldrin levels for the buildings in Area 7 are well below these limits. When dieldrin, which has the same exposure limits, is also considered, the calculated concentrations are still well below the OSHA/NIOSH exposure limits, even when the maximum pesticide dust detections are used with the maximum air concentrations. However, NIOSH considers both aldrin and dieldrin as potential carcinogens and recommends that occupational exposures to carcinogens be limited to the lowest feasible concentrations.

OSHA and NIOSH exposure limits for DDT are 0.5 mg/cubic meter and 1 mg/cubic meter, respectively. NIOSH classifies DDT as a potential human carcinogen and OSHA does not. OSHA and NIOSH exposure limits for endrin are 0.1 mg/cubic meter. Neither classifies endrin as a potential carcinogen. Based on the results from the sampling, the calculations show no exceedances of exposure limits for DDT or endrin. There are no OSHA/NIOSH published exposure limits for endrin ketone or isodrin.

Summary

The data collected do not indicate exceedances of OSHA/NIOSH standards for worker exposure

to the pesticides detected. However these standards are based on air concentrations of pesticides and do not take into account other media and exposure pathways, nor do the exposure limits account for the effects of multiple contaminants.

Aldrin, dieldrin, and DDT are classified as potential human carcinogens by NIOSH. NIOSH recommends limiting exposure to these chemicals to the lowest feasible levels. As such, it appears prudent to remove the stored equipment and materials from these buildings if other storage areas are available.

Reference: NIOSH Pocket Guide to Chemical Hazards, U.S. Department of Health and Human Services, 1994.