

The Board wanted DOL to add health effect data from a Table (Table 1 excerpt below) , which DOL has agreed to do. The issue we can't get a firm grasp on is the breast cancer health effect recommendation. The Board mentions two toxins when discussing the breast cancer health effect; however, we are not sure whether both toxins listed by the Board should be included (Aldrin & Dieldrin). Both are listed in SEM as occupational toxins, but it's unclear what we are to do about the reference to Dieldrin being a metabolite of Aldrin. We checked the transcript from the Board meeting and it really doesn't clarify the matter. It would seem that under the context of the recommendation – occupational exposure to Aldrin causes the human body to produce Dieldrin. The reference from the Board then connects Dieldrin to breast cancer. The question is what toxin from an occupational exposure connects to breast cancer. Is an occupational exposure to Dieldrin the same as having the body produce it from Aldrin intake? We also don't know what the reference to "inadequate evidence for Aldrin" means. We did not want to make any assumptions, so we need to defer on this issue and ask the Board for clarification. From Table 1, is breast cancer an accepted health effect from occupational exposure to one or both: Aldrin/Dieldrin?

Table 1 Continued: Group 2A Carcinogens with Limited evidence in humans for cancers

2A Carcinogen	Description	Associated Cancers	SEM Status
N, N-Dimethylformamide	Solvent (used in mfg fo polyacrylonitrile fibers, polyurethane and polyamide coatings, electronics, other)	Testicular Cancer	Present in SEM No associated cancer listed
Styrene		Lymphohematopoeitic malignancies (stronger and more consistent for AML and T-cell lymphoma)	Present in SEM No associated Cancer listed Styrene not listed under leukemia, lymphoma, or Lung cancer
Aldrin and its metabolite dieldrin [Inadequate evidence for aldrin, but limited evidence for its metabolite dieldrin]	Synthetic organochlorine pesticides	Cancer of the Breast	Present in SEM No associated Cancer listed in Haz-Map Breast Cancer not listed in SEM
Silicon Carbide "Whiskers"	"Silicon carbide	Lung Cancer	Present in SEM

Aldrin and its metabolite dieldrin

- Reviewed in IARC Monograph 117.
- Aldrin is a synthetic organochlorine pesticide that rapidly metabolized in humans to dieldrin, which is sequestered in fat and slowly excreted. One epidemiologic study of dieldrin in Denmark reported increased risk of breast cancer with a dose response. A similar but smaller study in Norway did not find a significant increase. Associations of breast cancer risk with dieldrin exposure were reported wives of men who had used dieldrin in a US agricultural study, and in the highest exposure category of a case control study in Long Island. Evidence of breast carcinogenicity in humans was considered limited. Evidence for non-Hodgkin lymphoma and other cancers in humans was considered insufficient. Evidence of hepatocellular carcinogenicity in animals was considered sufficient and mechanistic studies provided moderate evidence for multiple key characteristics of carcinogens. So dieldrin is classified as 2A with breast as the best supported cancer site. Human epidemiologic data on carcinogenicity of aldrin were considered insufficient in the 2016 IARC review, mechanistic evidence was sparse, however evidence of carcinogenicity of aldrin in animal studies was considered sufficient.
- IARC summary evaluation:
 - There is *inadequate evidence* in humans for the carcinogenicity of aldrin.

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- There is *limited evidence* in humans for the carcinogenicity of dieldrin.
A positive association has been observed between dieldrin and cancer of the breast
 - There is *sufficient evidence* in experimental animals for the carcinogenicity of aldrin and dieldrin
 - IARC: Because aldrin is rapidly metabolized to dieldrin in humans and experimental animals, exposure to aldrin always leads to internal exposure to dieldrin
 - SEM: both are present, but no link to breast cancer
 - Breast cancer is not listed in SEM at all
 - Include Dieldrin (and necessarily aldrin which metabolizes to dieldrin in list of 2A carcinogens with limited evidence in humans for specific cancers: Cancer of the breast