



GUAM ENVIRONMENTAL PROTECTION AGENCY • AHENSIAN PRUTEKSIÓN LINA'LA' GUÅHAN
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RISK ASSESSMENT DOCUMENT:

Interim Action Level for Dieldrin established by the Guam Environmental Protection Agency Board of Directors on November 21, 2024 pursuant to Guam Safe Drinking Water Act 10 GCA §53113

1. Summary

The Guam Environmental Protection Agency (Guam EPA) established an Interim Action Level (IAL) for the pesticide, dieldrin. This IAL applies to drinking water obtained from Public Water Systems (utilities, such as the Guam Waterworks Authority (GWA), U.S. Navy, or U.S. Air Force systems) and requires those Public Water Systems to notify consumers in accordance with the requirements of this IAL. This IAL for dieldrin is established under the authority granted to Guam EPA by the Guam Safe Drinking Water Act at 10 GCA § 53113.

Dieldrin is a human-made chemical that was used as an insecticide from the 1950s until 1987. Dieldrin has been identified as a probable carcinogen by the U.S. EPA and exposure to trace levels over long-durations of time may increase the likelihood of developing cancer. Dieldrin is still being detected in Guam's drinking water.

2. What is Dieldrin?

Dieldrin is an insecticide and a breakdown product of another insecticide called aldrin. Dieldrin and aldrin were widely used on crops like cotton and corn from the 1950s to 1970. The U.S. Department of Agriculture cancelled all uses of aldrin and dieldrin in 1970 for environmental hazards and potentially carcinogenic effects.

In 1972, the U.S. Environmental Protection Agency (EPA) approved aldrin and dieldrin for killing termites. The manufacturer of aldrin and dieldrin cancelled the insecticides' registration for termite control in 1987.

The U.S. EPA recognizes that dieldrin and aldrin may have adverse effects on the health of people. They chose to not regulate them in drinking water based on findings that the pesticides were banned, exposure to the chemicals was not nationally widespread, and an assumption that the occurrence would decrease over time since these insecticides were not being produced anymore.

3. Dieldrin in the Environment

Aldrin and dieldrin may be found in soil, water, or homes where the chemicals were used. Aldrin converts to dieldrin within a relatively short timeframe under typical environmental conditions. Dieldrin does not break down quickly in soil or water. It may take many years for large deposits of dieldrin to break down in soil. Dieldrin also builds up in the fatty tissues of animals, humans, and can be absorbed by plants.



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4. Dieldrin in Guam's Water

Levels of dieldrin in Guam's public water systems range from non-detect to 1.9 micrograms per liter (ug/L or parts per billion - ppb). Dieldrin has been found at levels above the laboratory detection limit of 0.01 ppb in 81 of Guam Waterworks Authority's (GWA's) active production wells, and three of those production wells are above the Interim Action Level of 0.2 ppb, all of which are located in the northern part of Guam.

Current dieldrin monitoring data is not available for the Anderson Air Force Base and the U.S. Navy public water systems, since it is not a regulated chemical.

Detections of aldrin are not found above levels of concern in Guam's water since it readily converts to dieldrin in the environment.

5. Monitoring Requirements

All Public Water Systems must monitor for dieldrin at all entry points at no less than a quarterly frequency, consistent with the monitoring requirements for other synthetic volatile organic compounds (SVOCs) under 22 GAR § 6141.24.

A reduction in monitoring frequency may be granted by Guam EPA on the basis of supportive monitoring data as allowable for other SVOCs under 22 GAR § 6141.24.

6. Interim Action Level (IAL)

Dieldrin is not regulated by the U.S. EPA and based on the risk assessment references listed below, Guam EPA established the following **Health-Based** IAL for dieldrin (Chemical Abstract Service (CAS) 60-57-1) in drinking water:

The Interim Action Level (IAL) will mandate public notification (within 30 days) to public water system customers in addition to issuing a "Do Not Drink without Treatment" advisory for areas receiving water that exceeds 0.2 ug/L (ppb).

In addition, public water system customers who receive or have received water that exceeds the non-cancer short-term health advisory of 0.5 ug/L shall be specifically notified (within 24 hours) of the average dieldrin concentration they have received and that it exceeds the short-term health advisory concentration.

Applicability of the IAL will be based on the running annual average of quarterly monitoring data for dieldrin, where it exists.

7. Consumer Health Information and Recommendations

If you receive water that is above the IAL:

Dieldrin is classified by the U.S. EPA as a probable human carcinogen. Long term consumption of water that exceeds the dieldrin IAL of 0.2 micrograms per liter (ug/L or parts per billion – ppb) represents an unacceptable long-term likelihood, or risk of developing cancer. Similarly, long-term consumption of water with elevated levels of dieldrin has been associated with adverse impacts on the liver and nervous system.



You should not drink or cook with water that contains dieldrin above the IAL without treatment. The most reliable form of treatment is granular activated carbon filters installed by your Public Water System (utility).

If a treatment system has not yet been installed by your Public Water System, Guam EPA recommends that you obtain water for drinking and cooking from a Department of Public Health and Social Services (DPHSS)-approved drinking water vendor. As of June 2023, all of the DPHSS approved drinking water vending services, employ both granular activated carbon and reverse osmosis processes. These treatments are proven to remove many contaminants from the water, including dieldrin.

An alternative to a water vendor would be to install a Point of Use (POU) device located at your home that includes granular activated carbon as part of its treatment process. A POU device is a treatment device installed at a single faucet or spigot for the purpose of reducing contaminants in drinking water at the source of installation. You should ensure that any POU device used in your home is certified by the National Sanitation Foundation (NSF) to meet the NSF-53 or 401 Standards. Make sure you replace the granular activated carbon filter in accordance with the POU device manufacturer's recommendations.

8. Notification Requirements

Upon final approval of this IAL, all Public Water Systems are required to notify their customers in accordance with this IAL and the public notification requirements under the Guam Safe Drinking Water Regulations Subpart Q, 22 GAR §§ 6141.201 – 6141.299 as follows, with the exception that exceedances of the IAL for dieldrin will not be considered a “violation” as stated in the Regulations because there is no established maximum contaminant level (MCL):

IAL Public Notice. Where monitoring data demonstrates that the IAL has been exceeded, public notification under the IAL will be considered a Tier 2 Public Notice, and must follow the relevant requirements of 22 GAR § 6141.203. Public notices must contain the mandatory notification language below. An IAL Tier 2 Public Notice template is attached. The Tier 2 Public Notice rules require that Public Water Systems provide the public notice “as soon as practical, but no later than 30 days after the system learns of the violation.”

For public water system customers who receive water or have received water that exceeds the non-cancer short-term health advisory of 0.5 ug/L, a Tier 1 Public Notice shall be issued and must follow the relevant requirements of 22 GAR § 6141.202. An IAL Tier 1 Public Notice template is attached. The Tier 1 Public Notice rules require that Public Water Systems provide the public notice “as soon as practical, but no later than 24 hours after the system learns of the violation.”



Mandatory Notification Language for Tier 2 Public Notification:

“Dieldrin is classified by the U.S. EPA as a probable human carcinogen. Water supplied by this public water system in your area exceeds the dieldrin IAL of 0.2 micrograms per liter (ug/L or parts per billion – ppb) established by Guam EPA and potentially represents an unacceptable long-term cancer risk. Long-term consumption of water containing dieldrin above the IAL increases the likelihood of developing cancer above acceptable levels.

You should not drink or cook with water that contains dieldrin above the IAL without treatment. The most reliable form of treatment is granular activated carbon filters installed by your Public Water System (utility). If a treatment system has not yet been installed by your Public Water System, Guam EPA recommends that you obtain water for drinking and cooking from a Department of Public Health and Social Services (DPHSS)-approved drinking water vendor or a Point of Use (POU) device located at your home that includes granular activated carbon as part of its treatment process.

A POU device is a treatment device installed at a single faucet or spigot for the purpose of reducing contaminants in drinking water at the source of installation. You should ensure that any POU device used in your home is certified by the National Sanitation Foundation (NSF) to meet the NSF-53 or 401 Standards. Also make sure you replace the granular activated carbon filter in accordance with the POU device manufacturer’s recommendations.

All drinking water vendors holding a valid DPHSS Sanitary Permit as of June 2023 have been verified by Guam EPA to provide treatment processes that are adequate to remove significant amounts of dieldrin. All of these systems employ both granular activated carbon and reverse osmosis processes. These treatments are proven to remove many contaminants from the water, including dieldrin.”

Mandatory Notification Language for Tier 1 Public Notification:

“Dieldrin is classified by the U.S. EPA as a probable human carcinogen. Water supplied by this public water system in your area exceeds the dieldrin IAL of 0.2 micrograms per liter (ug/L or parts per billion – ppb) established by Guam EPA and potentially represents an unacceptable long-term cancer risk. Long-term consumption of water containing dieldrin above the IAL increases the likelihood of developing cancer above acceptable levels.

Drinking water containing dieldrin is also associated with a wide range of adverse, non-cancer health effects at higher concentrations. In addition to exceeding the IAL, water in your area also exceeds the short-term, non-cancer health advisory concentration of 0.5 ug/L. Shorter-term consumption of water with dieldrin levels above this concentration have been associated with an increased likelihood of adverse impacts on the liver and nervous system.

You should not drink or cook with water that contains dieldrin above the IAL without treatment. The most reliable form of treatment is granular activated carbon filters installed by your Public Water System (utility). If a treatment system has not yet been installed by your Public Water System, Guam EPA recommends that you obtain water for drinking and cooking from a Department of Public Health and Social Services (DPHSS)-approved drinking water vendor or a Point of Use (POU) device located at your home that includes granular activated carbon as part of its treatment process.

A POU device is a treatment device installed at a single faucet or spigot for the purpose of reducing contaminants in drinking water at the source of installation. You should ensure that any POU device used in your home is certified by the National Sanitation Foundation (NSF) to meet the NSF-53 or 401.



Standards. Also make sure you replace the granular activated carbon filter in accordance with the POU device manufacturer's recommendations.

All drinking water vendors holding a valid DPHSS Sanitary Permit as of June 2023 have been verified by Guam EPA to provide treatment processes that are adequate to remove significant amounts of dieldrin. All of these systems employ both granular activated carbon and reverse osmosis processes. These treatments are proven to remove many contaminants from the water, including dieldrin."

9. Basis for IAL and Risk Assessment References

Guam EPA has reviewed available state and federal guidelines as well as risk assessments and has elected to establish an IAL for dieldrin at the level of 0.2 ug/L (ppb), which corresponds to a lifetime excess cancer risk of 10^{-4} (one-in-ten thousand). This is consistent with the National Contingency Plan (NCP) and the U.S. EPA risk assessment guidance, which generally recommends a range of acceptable risk for exposure to carcinogens between 10^{-6} (one-in-one million) to 10^{-4} (one-in-ten thousand). Additionally, the IAL of 0.2 ug/L is the same as the State of Hawaii's "Health Advisory" level.

The IAL is set to a level that is also protective of the wide range of dieldrin's adverse, non-cancer health effects, including impacts on the liver and nervous system. The U.S. EPA's short-term health advisory concentration for children is 0.5 ug/L (ppb). (U.S. EPA, 2018).

The federal risk assessments used in the development of Guam EPA's IAL for dieldrin may be accessed through the internet addresses provided below:

U.S. Environmental Protection Agency (U.S. EPA). (2018). *2018 Edition of the Drinking Water Standards and Health Advisories Tables* (EPA 822-F-18-001).

<https://www.epa.gov/system/files/documents/2022-01/dwtable2018.pdf>

U.S. EPA. (2003). *EPA Health Effects Support Document for Aldrin/Dieldrin* (EPA 822-R-03-001). U.S. Environmental Protection Agency (USEPA).

https://www.epa.gov/sites/default/files/2014-09/documents/support_cc1_aldrin-dieldrin_healtheffects.pdf



ATTACHMENT #1: IAL Tier 1 Public Notice Template

**DRINKING WATER WARNING
AND
DO NOT DRINK WITHOUT TREATMENT ADVISORY
[Water System Name] has high levels of dieldrin**

Our water system recently exceeded the dieldrin Interim Action Level (IAL). As our customers, you have a right to know what this means, what you should do, and what is being done to correct this situation.

On [given date], we received notice that the sample collected on [given date] showed dieldrin levels of [level and units]. This is above the dieldrin IAL for the short-term, non-cancer health advisory concentration of 0.5 micrograms per liter (ug/L or parts per billion – ppb).

What does this mean?

Dieldrin is classified by the U.S. EPA as a probable human carcinogen. Water supplied by this public water system in your area exceeds the dieldrin IAL of 0.2 micrograms per liter (ug/L or parts per billion – ppb) established by Guam EPA and potentially represents an unacceptable long-term cancer risk. Long-term consumption of water containing dieldrin above the IAL increases the likelihood of developing cancer above acceptable levels.

Drinking water containing dieldrin is also associated with a wide range of adverse, non-cancer health effects at higher concentrations. In addition to exceeding the IAL, water in your area also exceeds the short-term, non-cancer health advisory concentration of 0.5 ug/L. Shorter-term consumption of water with dieldrin levels above this concentration have been associated with an increased likelihood of adverse impacts on the liver and nervous system.

What should I do?

You should not drink or cook with water that contains dieldrin above the IAL without treatment. The most reliable form of treatment is granular activated carbon filters installed by your Public Water System (utility). If a treatment system has not yet been installed by your Public Water System, Guam EPA recommends that you obtain water for drinking and cooking from a Department of Public Health and Social Services (DPHSS)-approved drinking water vendor or a Point of Use (POU) device located at your home that includes granular activated carbon as part of its treatment process.

A POU device is a treatment device installed at a single faucet or spigot for the purpose of reducing contaminants in drinking water at the source of installation. You should ensure that any POU device used in your home is certified by the National Sanitation Foundation (NSF) to meet the NSF-53 or 401 Standards. Also make sure you replace the granular activated carbon filter in accordance with the POU device manufacturer's recommendations.

All drinking water vendors holding a valid DPHSS Sanitary Permit as of June 2023 have been verified by Guam EPA to provide treatment processes that are adequate to remove significant amounts of dieldrin. All of these systems employ both granular activated carbon and reverse osmosis processes. These treatments are proven to remove many contaminants from the water, including dieldrin.

What is being done?

[Describe corrective action.]

We are still detecting dieldrin. We will inform you when our sampling shows that no dieldrin is present. We anticipate resolving the problem within [estimated time frame].

For more information, please contact [name of contact] at [phone number] or [mailing address].

Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

This notice is being sent to you by [system]:

PWS ID#:

Date distributed:



ATTACHMENT #2: IAL Tier 2 Public Notice Template

**IMPORTANT INFORMATION ABOUT YOUR DRINKING WATER
AND
DO NOT DRINK WITHOUT TREATMENT ADVISORY**
Tests Show Dieldrin in [System] Water

Our water system recently exceeded the dieldrin Interim Action Level (IAL). Although this is not an emergency, as our customers, you have a right to know what this means, what you should do, and what is being done to correct this situation.

On [given date], we received notice that the sample collected on [given date] showed dieldrin levels of [level and units]. This is above the dieldrin IAL of 0.2 micrograms per liter (ug/L or parts per billion – ppb).

What does this mean?

Dieldrin is classified by the U.S. EPA as a probable human carcinogen. Water supplied by this public water system in your area exceeds the dieldrin IAL of 0.2 micrograms per liter (ug/L or parts per billion – ppb) established by Guam EPA and potentially represents an unacceptable long-term cancer risk. Long-term consumption of water containing dieldrin above the IAL increases the likelihood of developing cancer above acceptable levels.

What should I do?

You should not drink or cook with water that contains dieldrin above the IAL without treatment. The most reliable form of treatment is granular activated carbon filters installed by your Public Water System (utility). If a treatment system has not yet been installed by your Public Water System, Guam EPA recommends that you obtain water for drinking and cooking from a Department of Public Health and Social Services (DPHSS)-approved drinking water vendor or a Point of Use (POU) device located at your home that includes granular activated carbon as part of its treatment process.

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What is being done?

[Describe corrective action.]

We are still detecting dieldrin. We will inform you when our sampling shows that no dieldrin is present. We anticipate resolving the problem within [estimated time frame].

For more information, please contact [name of contact] at [phone number] or [mailing address].

Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

This notice is being sent to you by [system]:

PWS ID#:

Date distributed:

